ASMi-52CQ

2-Wire Quad SHDSL Modem Card

Version 2.12

LRS-24 Module

RAD
data communications
The Access Company

ASMi-52CQ

2-Wire Quad SHDSL Modem Card

Version 2.12

Installation and Operation Manual

Notice

Limited Warranty

RAD warrants to DISTRIBUTOR that the hardware in the ASMi-52CQ to be delivered hereunder shall be free of defects in material and workmanship under normal use and service for a period of twelve (12) months following the date of shipment to DISTRIBUTOR.

If, during the warranty period, any component part of the equipment becomes defective by reason of material or workmanship, and DISTRIBUTOR immediately notifies RAD of such defect, RAD shall have the option to choose the appropriate corrective action: a) supply a replacement part, or b) request return of equipment to its plant for repair, or c) perform necessary repair at the equipment's location. In the event that RAD requests the return of equipment, each party shall pay one-way shipping costs.

RAD shall be released from all obligations under its warranty in the event that the equipment has been subjected to misuse, neglect, accident or improper installation, or if repairs or modifications were made by persons other than RAD's own authorized service personnel, unless such repairs by others were made with the written consent of RAD.

The above warranty is in lieu of all other warranties, expressed or implied. There are no warranties which extend beyond the face hereof, including, but not limited to, warranties of merchantability and fitness for a particular purpose, and in no event shall RAD be liable for consequential damages.

RAD shall not be liable to any person for any special or indirect damages, including, but not limited to, lost profits from any cause whatsoever arising from or in any way connected with the manufacture, sale, handling, repair, maintenance or use of the ASMi-52CQ, and in no event shall RAD's liability exceed the purchase price of the ASMi-52CQ.

DISTRIBUTOR shall be responsible to its customers for any and all warranties which it makes relating to ASMi-52CQ and for ensuring that replacements and other adjustments required in connection with the said warranties are satisfactory.

Software components in the ASMi-52CQ are provided "as is" and without warranty of any kind. RAD disclaims all warranties including the implied warranties of merchantability and fitness for a particular purpose. RAD shall not be liable for any loss of use, interruption of business or indirect, special, incidental or consequential damages of any kind. In spite of the above RAD shall do its best to provide error-free software products and shall offer free Software updates during the warranty period under this Agreement.

RAD's cumulative liability to you or any other party for any loss or damages resulting from any claims, demands, or actions arising out of or relating to this Agreement and the ASMi-52CQ shall not exceed the sum paid to RAD for the purchase of the ASMi-52CQ. In no event shall RAD be liable for any indirect, incidental, consequential, special, or exemplary damages or lost profits, even if RAD has been advised of the possibility of such damages.

This Agreement shall be construed and governed in accordance with the laws of the State of Israel.

Product Disposal

To facilitate the reuse, recycling and other forms of recovery of waste equipment in protecting the environment, the owner of this RAD product is required to refrain from disposing of this product as unsorted municipal waste at the end of its life cycle. Upon termination of the unit's use, customers should provide for its collection for reuse, recycling or other form of environmentally conscientious disposal.

General Safety Instructions

The following instructions serve as a general guide for the safe installation and operation of telecommunications products. Additional instructions, if applicable, are included inside the manual.

Safety Symbols

⚠️ *Warning*	This symbol may appear on the equipment or in the text. It indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.

⚡	Danger of electric shock! Avoid any contact with the marked surface while the product is energized or connected to outdoor telecommunication lines.

⏚	Protective earth: the marked lug or terminal should be connected to the building protective earth bus.

☀ *Warning*	Some products may be equipped with a laser diode. In such cases, a label with the laser class and other warnings as applicable will be attached near the optical transmitter. The laser warning symbol may be also attached. Please observe the following precautions: • Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter. • Do not attempt to adjust the laser drive current. • Do not use broken or unterminated fiber-optic cables/connectors or look straight at the laser beam. • The use of optical devices with the equipment will increase eye hazard. • Use of controls, adjustments or performing procedures other than those specified herein, may result in hazardous radiation exposure. ATTENTION: The laser beam may be invisible!

In some cases, the users may insert their own SFP laser transceivers into the product. Users are alerted that RAD cannot be held responsible for any damage that may result if non-compliant transceivers are used. In particular, users are warned to use only agency approved products that comply with the local laser safety regulations for Class 1 laser products.

Always observe standard safety precautions during installation, operation and maintenance of this product. Only qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this product. No installation, adjustment, maintenance or repairs should be performed by either the operator or the user.

Handling Energized Products

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present inside certain products even when the power switch (if installed) is in the OFF position or a fuse is blown. For DC-powered products, although the voltages levels are usually not hazardous, energy hazards may still exist.

Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.

Unless otherwise specified, all products are intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective earth terminal. If an earth lug is provided on the product, it should be connected to the protective earth at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in earthed racks and cabinets.

Always make the ground connection first and disconnect it last. Do not connect telecommunication cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Some products may have panels secured by thumbscrews with a slotted head. These panels may cover hazardous circuits or parts, such as power supplies. These thumbscrews should therefore always be tightened securely with a screwdriver after both initial installation and subsequent access to the panels.

Connecting AC Mains

Make sure that the electrical installation complies with local codes.

Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Always connect the power cord first to the equipment and then to the wall socket. If a power switch is provided in the equipment, set it to the OFF position. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building installation.

In cases when the power distribution system is IT type, the switch must disconnect both poles simultaneously.

Connecting DC Power

Unless otherwise specified in the manual, the DC input to the equipment is floating in reference to the ground. Any single pole can be externally grounded.

Due to the high current capability of DC power systems, care should be taken when connecting the DC supply to avoid short-circuits and fire hazards.

DC units should be installed in a restricted access area, i.e. an area where access is authorized only to qualified service and maintenance personnel.

Make sure that the DC power supply is electrically isolated from any AC source and that the installation complies with the local codes.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Before connecting the DC supply wires, ensure that power is removed from the DC circuit. Locate the circuit breaker of the panel board that services the equipment and switch it to the OFF position. When connecting the DC supply wires, first connect the ground wire to the corresponding terminal, then the positive pole and last the negative pole. Switch the circuit breaker back to the ON position.

A readily accessible disconnect device that is suitably rated and approved should be incorporated in the building installation.

If the DC power supply is floating, the switch must disconnect both poles simultaneously.

Connecting Data and Telecommunications Cables

Data and telecommunication interfaces are classified according to their safety status.

The following table lists the status of several standard interfaces. If the status of a given port differs from the standard one, a notice will be given in the manual.

Ports	Safety Status	
V.11, V.28, V.35, V.36, RS-530, X.21, 10 BaseT, 100 BaseT, Unbalanced E1, E2, E3, STM, DS-2, DS-3, S-Interface ISDN, Analog voice E&M	SELV	Safety Extra Low Voltage: Ports which do not present a safety hazard. Usually up to 30 VAC or 60 VDC.
xDSL (without feeding voltage), Balanced E1, T1, Sub E1/T1	TNV-1	Telecommunication Network Voltage-1: Ports whose normal operating voltage is within the limits of SELV, on which overvoltages from telecommunications networks are possible.
FXS (Foreign Exchange Subscriber)	TNV-2	Telecommunication Network Voltage-2: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are not possible. These ports are not permitted to be directly connected to external telephone and data lines.
FXO (Foreign Exchange Office), xDSL (with feeding voltage), U-Interface ISDN	TNV-3	Telecommunication Network Voltage-3: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are possible.

Always connect a given port to a port of the same safety status. If in doubt, seek the assistance of a qualified safety engineer.

Always make sure that the equipment is grounded before connecting telecommunication cables. Do not disconnect the ground connection before disconnecting all telecommunications cables.

Some SELV and non-SELV circuits use the same connectors. Use caution when connecting cables. Extra caution should be exercised during thunderstorms.

When using shielded or coaxial cables, verify that there is a good ground connection at both ends. The earthing and bonding of the ground connections should comply with the local codes.

The telecommunication wiring in the building may be damaged or present a fire hazard in case of contact between exposed external wires and the AC power lines. In order to reduce the risk, there are restrictions on the diameter of wires in the telecom cables, between the equipment and the mating connectors.

Caution	To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cords.

Attention	Pour réduire les risques s'incendie, utiliser seulement des conducteurs de télécommunications 26 AWG ou de section supérieure.

Some ports are suitable for connection to intra-building or non-exposed wiring or cabling only. In such cases, a notice will be given in the installation instructions.

Do not attempt to tamper with any carrier-provided equipment or connection hardware.

Electromagnetic Compatibility (EMC)

The equipment is designed and approved to comply with the electromagnetic regulations of major regulatory bodies. The following instructions may enhance the performance of the equipment and will provide better protection against excessive emission and better immunity against disturbances.

A good earth connection is essential. When installing the equipment in a rack, make sure to remove all traces of paint from the mounting points. Use suitable lock-washers and torque. If an external grounding lug is provided, connect it to the earth bus using braided wire as short as possible.

The equipment is designed to comply with EMC requirements when connecting it with unshielded twisted pair (UTP) cables. However, the use of shielded wires is always recommended, especially for high-rate data. In some cases, when unshielded wires are used, ferrite cores should be installed on certain cables. In such cases, special instructions are provided in the manual.

Disconnect all wires which are not in permanent use, such as cables used for one-time configuration.

The compliance of the equipment with the regulations for conducted emission on the data lines is dependent on the cable quality. The emission is tested for UTP with 80 dB longitudinal conversion loss (LCL).

Unless otherwise specified or described in the manual, TNV-1 and TNV-3 ports provide secondary protection against surges on the data lines. Primary protectors should be provided in the building installation.

The equipment is designed to provide adequate protection against electro-static discharge (ESD). However, it is good working practice to use caution when connecting cables terminated with plastic connectors (without a grounded metal hood, such as flat cables) to sensitive data lines. Before connecting such cables, discharge yourself by touching earth ground or wear an ESD preventive wrist strap.

FCC-15 User Information

This equipment has been tested and found to comply with the limits of the Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the Installation and Operation manual, may cause harmful interference to the radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Emission Requirements

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Warning per EN 55022 (CISPR-22)

Warning	This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user will be required to take adequate measures.
Avertissement	Cet appareil est un appareil de Classe A. Dans un environnement résidentiel, cet appareil peut provoquer des brouillages radioélectriques. Dans ces cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.
Achtung	Das vorliegende Gerät fällt unter die Funkstörgrenzwertklasse A. In Wohngebieten können beim Betrieb dieses Gerätes Rundfunkströrungen auftreten, für deren Behebung der Benutzer verantwortlich ist.

Declaration of Conformity

Manufacturer's Name: RAD Data Communications Ltd.

Manufacturer's Address: 24 Raoul Wallenberg St., Tel Aviv 69719, Israel

declares that the product:

Product Name: ASMi-52CQ

conforms to the following standard(s) or other normative document(s):

EMC:	EN 55022:1998	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.
	EN 50024: 1998 A1:2001, A2:2003	Information technology equipment – Immunity characteristics – Limits and methods of measurement.
Safety:	EN 60950: 2001	Information technology equipment – Safety – Part 1: General requirements.

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC, the Low Voltage Directive 73/23/EEC and the R&TTE Directive 1999/5/EC for wired equipment. The product was tested in a typical configuration.

Tel Aviv, 4 September 2005

Haim Karshen

VP Quality

European Contact: RAD Data Communications GmbH, Otto-Hahn-Str. 28-30, 85521 Ottobrunn-Riemerling, Germany

Quick Start Guide

If you are familiar with ASMi-52CQ, use this guide to prepare the unit for operation.

1.   Installing ASMi-52CQ

➤ **To install the ASMi-52CQ card:**

1. Insert the ASMi-52CQ card into a slot of the LRS-24 chassis.

2. Insert the interface module into the upper section of LRS-24F or back of LRS-24B.

3. Connect the line and DCE cables.

2.   Configuring ASMi-52CQ

Accessing the Supervisory Terminal

➤ **To start the communication session:**

1. Connect the terminal to the CM-2 RS-232 front connector of the LRS-24 chassis.

2. Power up the hub.

   The opening screen appears, followed by the **CM2›** prompt.

➤ **To access the Modem Setup menu:**

1. At the **CM2›** prompt, select **Modem Parameters** and press **‹Enter›**.

   The following message appears:

   Please enter the slot number (1-12)

2. Type the slot number of the ASMi-52CQ card and press **‹Enter›**.

Configuring the Clock Source

➤ **To configure the clock source:**

- In the Modem Setup menu, move the cursor to **CLOCK SOURCE LOC/REM** field by pressing **‹Tab›** and select the clock source for the selected modem.

Configuring the DTE Interface

To configure the ASMi-52CQ DTE interface (serial, E1 or T1), refer to the appropriate section below.

Configuring the Serial Interface

➤ **To configure the serial interface:**

- In the Modem Setup menu, move the cursor to **DATA RATE** field by pressing ‹**Tab**› and select the desired transmission rate by pressing ‹**F**› or ‹**B**›.

Configuring the E1 Interface

➤ **To configure the E1 parameters:**

1. In the Modem Setup menu, move the cursor to **NEXT PARMETERS (E1)** field by pressing ‹**Tab**› and select **YES** by pressing ‹**F**› or ‹**B**›.

   The Modem Setup Menu: E1 Parameters screen appears.

2. Configure the following E1 parameters:

   - Framing mode
   - Sync (sync loss recovery time)
   - CRC-4 error checking
   - Idle code
   - Time Slot Assign
   - Unit Identical Set
   - E1 timeslots: Assign each E1 timeslot to carry data or idle code.

Note
- *Timeslot 0 may be looped or transparent.*
- *When operating with G732S framing, timeslot 0 is always transparent and timeslot 16 is always connected.*
- *When operating opposite* ASMi-52CQ *with V.35 interface, assign at least three timeslots, not including timeslot 0 to carry data.*

Configuring the T1 Interface

1. In the Modem Setup menu, move the cursor to **NEXT PARMETERS (T1)** field by pressing ‹**Tab**› and select **YES** by pressing ‹**F**› or ‹**B**›.

   The Modem Setup menu: T1 Parameters screen appears.

2. Configure the following T1 parameters:

   - Framing mode
   - Line coding
   - Idle Code
   - Time Slot Assign

- Unit Identical Set

- Receive gain

- Interface

- Transmit signal mask (DSU mode)

- Transmit signal mask (CSU mode)

- Fbit configuration.

Configuring the Line Parameters

➤ **To configure the line parameters:**

1. If you have configured E1/T1 parameters, press **‹ESC›** to return to the main menu, and then repeat the steps above to access the Modem Setup menu.

2. In the Modem Setup menu, move the cursor to **NEXT PARMETERS (LINE)** field by pressing **‹Tab›** and select **YES** by pressing **‹F›** or **‹B›**.

   The Modem Setup Menu: Line Parameters screen appears.

3. Configure the following line parameters:

   - Power backoff

   - Snext margin, if line probing is set to adaptive

   - Current margin, if line probing is set to adaptive

   - Power spectral density (line probing set to fixed only)

   - Line probing

   - Transmission mode

   - Loop attenuation threshold

   - SNR margin threshold.

Contents

Chapter 1

Introduction

1.1 Overview

ASMi-52CQ is a card containing four independent 2-wire Synchronous High Bit Rate Digital Subscriber Line (SHDSL) modems operating in full-duplex over 2-wire lines. It offers a cost effective solution delivering digital data to customer premises over existing copper cables. ASMi-52CQ handles multiples data rates in the range of 64–2304 kbps. The modem card includes four modems, supporting RS-530, V.35, X.21 and E1/T1 DTE interfaces. ASMi-52CQ uses TC-PAM coding and complies with the ITU-T G.991.2 requirements.

ASMi-52CQ is housed within RAD's compact 12-slot LRS-24 Access Rack, enabling up to 48 modems in one rack and drastically reducing port price. LRS-24 is managed by the RADview SNMP management tool, Telnet or an ASCII terminal. A card can be removed and re-inserted without powering down the system and without affecting operation of other modules in the system.

Product Options

ASMi-52CQ is available in the following versions.

- ASMi-52CQF (ETSI)
- ASMi-52CQB (ANSI).

Application

ASMi-52CQ can establish a communication link with an ASMi-52 standalone modem whose data rate is between 64 kbps and 2304 kbps (see *Table* 1-1). A central site application for ASMi-52CQ with SNMP management is shown in *Figure* 1-1.

Note *The ASMi-52CQ operates opposite standalone ASMi-52 or ASMi-52L devices only.*
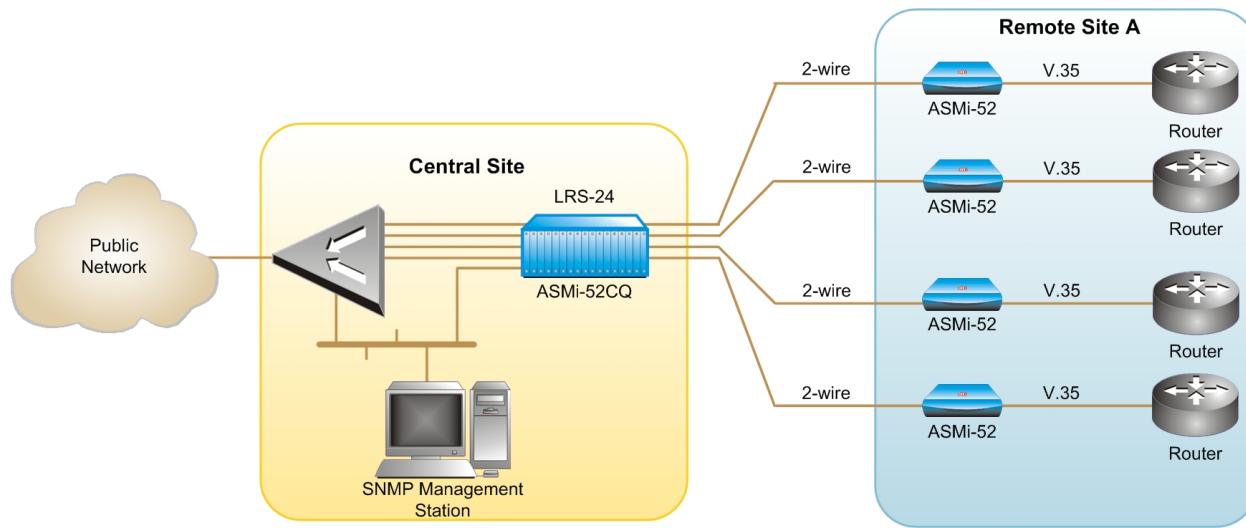
Figure 1-1. Central Site Application with SNMP Management Application

Features

Line Interface

ASMi-52CQ operates over 2-wire lines. ASMi-52CQ extends the range of data transmission over 2-wire lines up to 7.0 km (4.3 miles), by employing SHDSL TC-PAM technology. ASMi-52CQ operation complies with the requirements of the ITU-T G.991.2 standard.

Table 1-1 lists typical ASMi-52CQ ranges over 26 AWG line.

Table 1-1. Typical ASMi-52CQ Ranges over 26 AWG

Data Rate	Range	
[kbps]	[km]	[miles]
64	7.0	4.3
128	7.0	4.3
256	7.0	4.3
384	6.0	3.7
512	5.5	3.4
1024	4.2	2.6
2048	3.5	2.2
2304	3.4	2.1

DTE Interface

ASMi-52CQ supports a wide range of digital interfaces: RS-530, V.35, X.21, G.704 E1/T1, and UTP (10BaseT or 100BaseT) Ethernet interface. The required interface is provided using the appropriate interface module.

Table 1-2 lists the ASMi-52CQ digital interface versions with their appropriate interface modules and DCE connectors.

Note

LRSI-27 (ETH) module operates with ASMi-52CQ-Ethernet card only.

Table 1-2. ASMi-52CQ Interface Modules

Interface Module	DTE Interface	Connector	
		DTE	**Line**
LRSI-F-18 LRSI-B-18	RS-530	SCSI 68-pin cable adapter for four 25-pin D-type female connectors	RJ-11
	X.21	SCSI 68-pin cable adapter for four 15-pin D-type female connectors	RJ-11
	V.35	SCSI 68-pin cable adapter for four 34-pin female connectors	RJ-11
LRSI-F-19 LRSI-B-19	RS-530	SCSI 68-pin cable adapter for four 25-pin D-type female connectors	Terminal block
	X.21	SCSI 68-pin cable adapter for four 15-pin D-type female connectors	Terminal block
	V.35	SCSI 68-pin cable adapter for four 34-pin female connectors	Terminal block
LRSI-F-20 LRSI-B-20	G.704 E1/T1	Four RJ-11 connectors, balanced	Terminal block
LRSI-F-21 LRSI-B-21	G.704 E1	25-pin D-type female, unbalanced	Terminal block
LRSI-F-27 LRSI-B-27	ETH	Four RJ-45 connectors	Terminal block
LRSI-F-28 LRSI-B-28	Balanced G.704 E1/T1	Four RJ-11 connectors	Two RJ-45 connectors
LRSI-F-29 LRSI-B-29	Unbalanced G.704 E1	25-pin D-type female	Two RJ-45 connectors

Timing

ASMi-52CQ supports three clock modes:

- Internal, derived from its internal oscillator
- External, supplied by the attached DTE
- System, supplied by the LRS-24 station clock input
- Receive, derived from the SHDSL line

Table 1-3 details the ASMi-52CQ data rates with all possible combinations of DTE interface types and clock modes. Each port can have its own separate clocking.

| *Note* | *If the DTE interface is E1 or T1 and receive clocking is chosen for one port, all ports must use receive clocking.* |

Table 1-3. ASMi-52CQ Data Rates

DTE Interface	Clock Mode	Data Rate
V.35, RS-530, X.21, ETH	Internal	$n \times 64$ kbps (n = 1, 2, ..., 32, 36)
V.35, RS-530, X.21	External	$n \times 64$ kbps (n = 1, 2, ..., 36)
V.35, RS-530, X.21, ETH	Station	$n \times 64$ kbps (n = 1, 2, ..., 32)
E1	Internal, external, station, receive	$n \times 64$ kbps (n = 1, 2, ..., 32)
T1	Internal, external, station, receive	$n \times 64$ kbps (n = 1, 2, ..., 24)

Remote Management

ASMi-52CQ allows full management of the local and remote modems using SNMP management, Telnet or an ASCII terminal via the CM-2 card of the LRS-24 modem rack. Management of the remote unit is achieved via an inband channel that allows simultaneous remote configuration for both modems, real-time alerts on failures, diagnostic tests, and statistical information on system performance. The configuration parameters are stored in card flash memory.

The modem uses an Embedded Operation Channel (EOC) for controlling and monitoring the remote unit in accordance with the SHDSL (G.991.2) standard. The management channel operates without interfering with data transmission.

The operator can perform diagnostic tests from the remote ASMi-52 modem.

Diagnostics

ASMi-52CQ has comprehensive diagnostics capabilities that are activated from either the ASCII terminal or from an SNMP management tool. They include the following test options:

- V.54 local analog and remote digital loopbacks
- V.54 BER test
- SHDSL statistics collection.

All tests can be activated from the local unit or from the remote unit. SHDSL statistics can be activated from the RADview SNMP management tool.

Software Download

ASMi-52CQ supports downloading software from CM-2 to the local modem card.

Real-time Alarms

Real-time alarms provide real time information on system status indicating management failure, loss of synchronization, etc.

ASMi-52CQ also features a log file that stores all alarms and events that occurred in the unit. These alarms can be displayed and cleared.

Statistics Collection

ASMi-52CQ stores the SHDSL statistics for the line performance monitoring. This is accessed from RADview, an SNMP management tool. When equipped with G.704 E1/T1 interface, the modem collects E1/T1 performance statistics as per ITU-T G.706 requirements.

Line Protection

ASMi-52CQ incorporates high-voltage line protection in compliance with ITU-T K.21 surge protection standard.

1.2   Physical Description

Figure 1-2 shows the front panels of the ASMi-52CQ module. It includes LEDs that display the status of power, data flow, control signals, and diagnostics for each of the four modems.

For a detailed description of the LED functions and states, see *Front Panel LEDs* in *Chapter 3*.
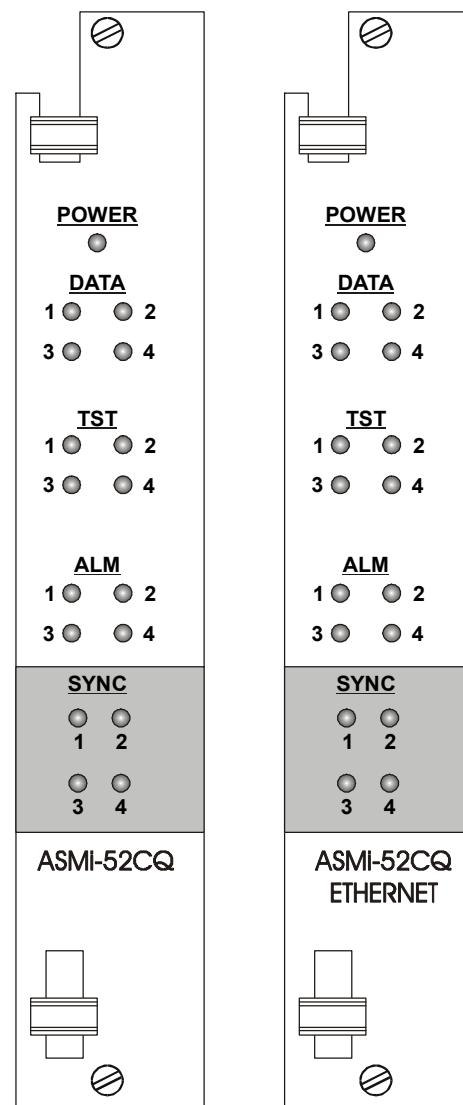
Figure 1-2. ASMi-52CQ Front Panels

The ASMi-52CQ is coupled to the LRS-24 chassis backplane and to the digital interface card by three connectors. The backplane connectors are described in *Table* 1-4.

Table 1-4. ASMi-52CQ Connectors

Connector	No. of Pins	Function	Use
J5	96	Data	Carrying data and signaling to/from the Interface module in the LRS-24 chassis.
J6	48	Control	Carrying management information between the ASMi-52CQ module and the control module (CM-2) and supplying -5V from the chassis power supply module.
J11	8	Power	Supplying +5V from the chassis power supply module.

1.3   Functional Description

Following is a functional description of ASMi-52CQ. Refer to the figure below for the ASMi-52CQ block diagram.
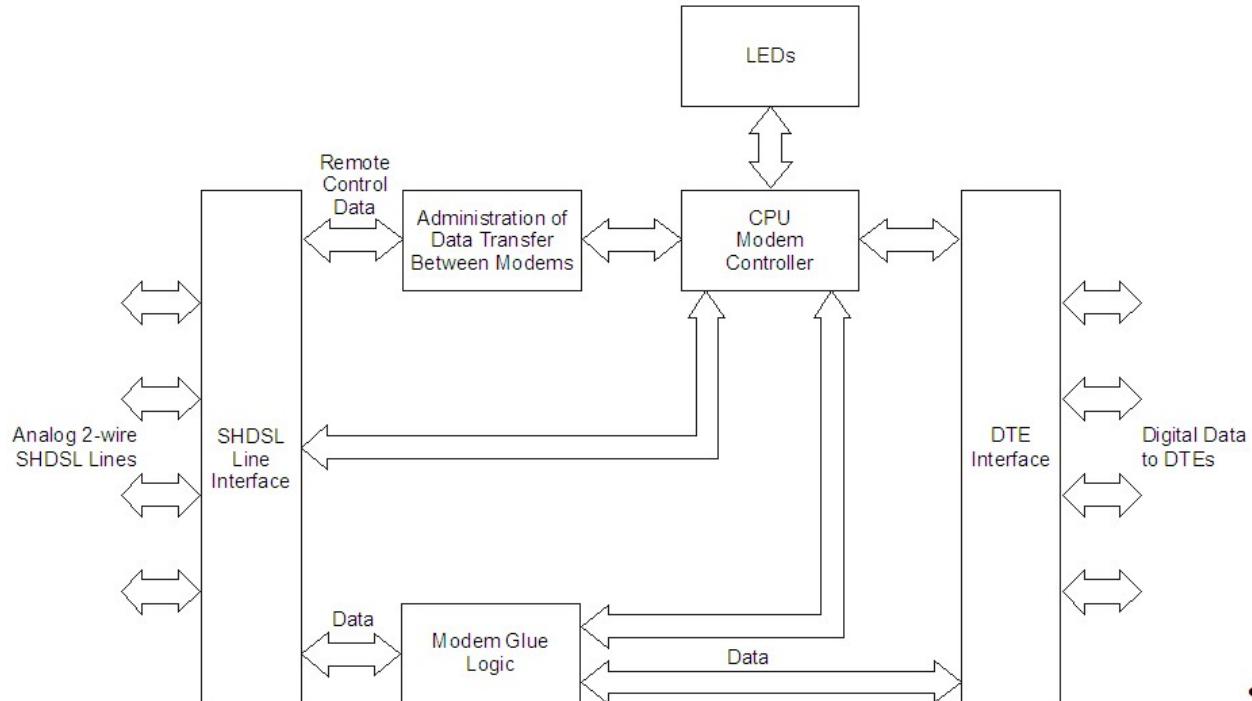
Figure 1-3. ASMi-52CQ with V.35 Interface, Block Diagram

The ASMi-52CQ modem card consists of the following major modules:

- **SHDSL Interface Module** – This module translates the received and transmitted data from the four lines to the four DTE interfaces.

- **Modem Glue Logic Module** – This module processes the data from/to the SHDSL interface module.

- **Administration Data Transfer Module** – This module manages the data transfer between the modems on both sides of the line.

- **Modem Controller** – This module, based on a MC68302 microprocessor, controls the ASMi-52CQ operation.

- **LEDs Module** – This module provides modem status information via LED indicators on the front panel.

- **Digital Interface** – This module prepares the digital data coming from the DTE into a data stream for the modem glue logic. In addition it translates the data from the modem glue logic into digital data to be sent to the DTE.

1.4   Technical Specifications

Line Interface

Type	2-wire unconditioned dedicated line
Line Coding	TC-PAM
Range	See *Table 1-1*
Impedance	135Ω
Connector	RJ-11 or 2-pin terminal block
Protection	ITU K.21, UL1950

DTE Interface

Data Rate	See *Table 1-3*
E1 Coding	HDB3
E1 Line Impedance	120Ω, Balanced
	75Ω, Unbalanced
T1 Coding	AMI
T1 Line Impedance	100Ω, Balanced

	Connector	V.35: SCSI-68 and adapter cable
		X.21: SCSI-68 and adapter cable
		RS-530: SCSI-68 and adapter cables
		G.704 E1: four RJ-11s (Balanced) or DB-25 female (Unbalanced)
		G.704 T1: four RJ-11s (Balanced)
		ETH: four RJ-45s
Timing	*Transmit Clock*	Derived from three alternative sources:
		Internal oscillator
		External, from the attached DTE (except ETH)
		System, distributed by the LRS-24 modem rack
		Receive, from the SHDSL line
Diagnostics	*Loopbacks*	Local analog loopback, activated via management software
		Remote digital loopback, activated via management software
	BER Test	BER test, activated via management software
	Performance Monitoring (via RADview)	E1 with CRC-4 or T1 with ESF framing: per ITU G.706
		E1 without CRC-4 or T1 with SF framing: bipolar violations (BPV)
		SHDSL performance
Management	*Type*	RADview SNMP management tool, Telnet or ASCII terminal
Physical	*Interface Module*	LRSI-F-18, LRSI-F-19, LRSI-F-20, LRSI-F-21, LRSI-F-27, LRSI-F-28, LRSI-F-29 one for each ASMi-52CQ module connected to four DTE and four line ports
Indicators	*POWER*	Power
	DATA	Data transmitted or received
	TST	Test mode
	ALM	Alarm occurs
	SYNC	Line synchronization
Power	*Voltage*	+5V and -5V, both fuse-protected
	Power Consumption	10.5W max.

Environment   *Temperature*   0°–45°C (32°–113°F)

                     Humidity   Up to 90%, non–condensing

Chapter 2

Installation and Operation

2.1 Introduction

This chapter provides installation and operation instructions for the ASMi-52CQ card and the applicable Interface modules. The information presented in this chapter supplements the general instructions for installation and operation of the LRS-24F or LRS-24B chassis.

After installing the ASMi-52CQ modem and interface module and powering up the chassis, the front panel LEDs should assume the states as shown in *Chapter 3*. In case of a problem, refer to *Chapter 6*. For system configuration, refer to *Chapter 4*.

⚠️
Warning

The operator or the user should not perform internal settings, adjustment, maintenance, and repairs; such operations should only be performed by a skilled technician aware of the hazards involved.

Always observe standard safety precautions during the installation, operation, and maintenance of this product.

Caution

The ASMi-52CQ module contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, always hold modules by the sides and do not touch the module components or connectors.

Note

Before installing the product, review Handling Energized Products *at the beginning of the manual.*

2.2 Site Requirements and Prerequisites

ASMi-52CQ cards are installed in a LRS-24 chassis. See the LRS-24 Installation and Operation Manual for instructions on operating the LRS-24.

The ambient operating temperature of ASMi-52CQ should be 32° to 113°F (0° to 45°C), at a relative humidity of up to 90%, non-condensing.

ASMi-51CQ modem cards installed in the LRS-24 hub require cooling. This is provided by a fan tray installed under the LRS-24.

2.3   Package Contents

The ASMi-52CQ package includes the following items:

- ASMi-52CQ modem card

- Matching interface module

- Technical documentation CD

- Adapter cable for connecting an interface module to the appropriate DTE:

    - RS-530 – CBL-CQ-RS530/F (if ordered)
      One SCSI-68 to four female RS-530 (DB-25) connectors

    - V.35 – CBL-CQ-V35/F (if ordered)
      One SCSI-68 to four female V.35 (34-pin) connectors

    - X.21 – CBL-CQ-X21/F (if ordered)
      One SCSI-68 to four female X.21 (DB-15) connectors

    - Unbalanced G.704 E1 – CBL-LRSI21/DB25/UB/M (if ordered)
      One DB-25 to eight male BNC coax connectors

    - Unbalanced G.704 E1 – CBL-LRSI21/DB25/UB/F (if ordered)
      One DB-25 to eight female BNC coax connectors.

2.4   Installing ASMi-52CQ

Figure 2-1 illustrates layout of the ASMi-52CQ module.
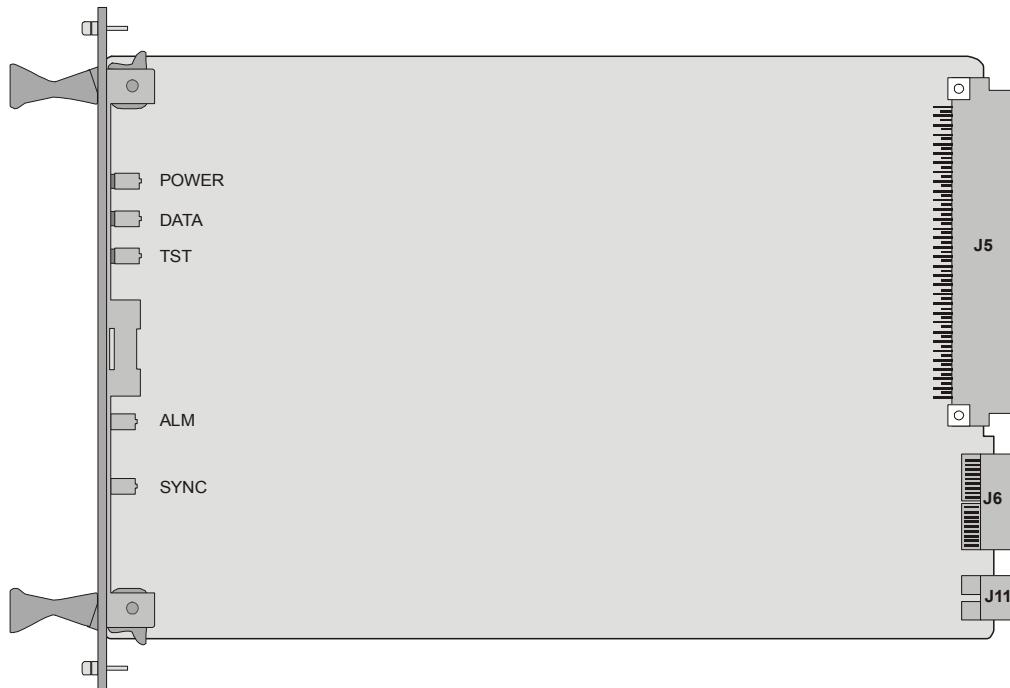
Figure 2-1. ASMi-52CQ Layout

Installing the Modem Card

➤ **To install the ASMi-52CQ card into the LRS-24 chassis:**

1. Refer to the system installation plan and insert the ASMi-52CQ module in the assigned I/O slot of the LRS-24 enclosure.

2. Fasten the two front panel screws to secure the module to the LRS-24 frame for proper grounding.

Installing the Interface Modules

Inspecting the Interface Module

Check that the supplied interface modules meet the physical and electrical interface requirements of the installation site, according to *Table 1-2.*

Note   *LRSI-F-xx interface modules are placed in the top section of the LRS-24F chassis; LRSI-B-xx interface modules are placed in the back section of the LRS-24B chassis.*

Installing the Interface Module into the Chassis

➤ **To install the interface module into the LRS-24 chassis:**

1. Insert the interface module into the upper section above the ASMi-52CQ module of the LRS-24F chassis, or back section of the LRS-24B chassis.

2. Fasten two front panel screws to secure the module to the LRS-24 frame for proper grounding.

2.5   Connecting the Interfaces

The ASMi-52CQ modem is connected to the line and DTE via the interface module. Identify the necessary cables for the interface module you have installed and prepare the line and DCE cables.

For details about preparing the line cables, see *Appendix B*.

Note   *The connection instructions for the B-type interfaces are identical to those shown for the following F-type interfaces.*

Connecting the LRSI-F-18 Interface
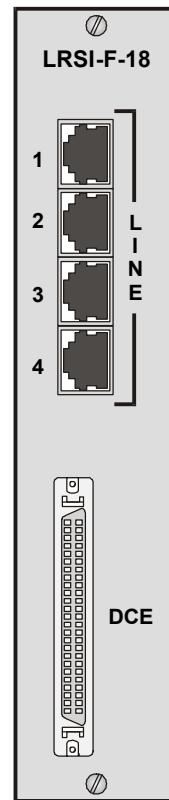
Figure 2-2. LRSI-F-18

➤ **To connect the LRSI-F-18 interface module:**

1. Connect the SHDSL cables terminated in RJ-11 connectors into the card connectors marked LINE.

2. Connect a 68-pin SCSI adapter cable into the connector marked DCE. Depending on the interface, use the following cables available from RAD:

Table 2-1. LRSI-F-18 Interface Adapter Cables

DCE Interface Type	Cable Number	Terminating Connectors
RS-530	**CBL-CQ-RS530/F**	4 female DB-25 RS-530
V.35	**CBL-CQ-V35/F**	4 female 34-pin V.35
X.21	**CBL-CQ-X21/F**	4 female DB-15 X.21

Connecting the LRSI-F-19 Interface
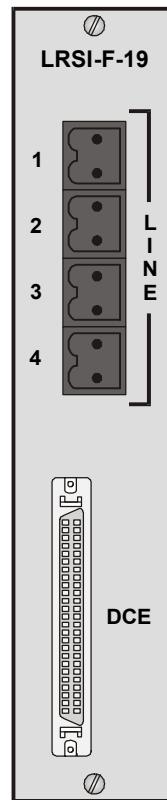
Figure 2-3. LRSI-F-19

➤ **To connect the LRSI-F-19 interface module:**

1. Connect the SHDSL cables terminated in terminal blocks into the connectors marked LINE.

2. Connect a 68-pin SCSI adapter cable into the connector marked DCE. Depending on the interface, use the following cables available from RAD:

Table 2-2. LRSI-F-19 Interface Adapter Cables

DCE Interface Type	Cable Number	Terminating Connectors
RS-530	**CBL-CQ-RS530/F**	4 female DB-25 RS-530
V.35	**CBL-CQ-V35/F**	4 female 34-pin V.35
X.21	**CBL-CQ-X21/F**	4 female DB-15 X.21

Connecting the LRSI-F-20 Interface
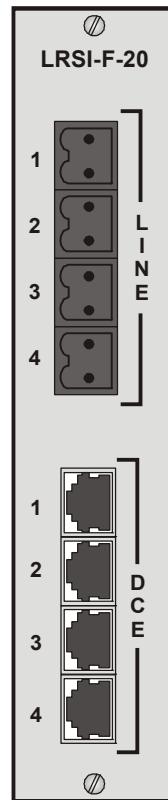
Figure 2-4. LRSI-F-20

➤ **To connect the LRSI-F-20 interface module:**

1. Connect the SHDSL cables terminated in terminal blocks into the card connectors marked LINE.

2. Connect the G.704 E1/T1 balanced lines terminating in RJ-11 connectors into the card connectors marked DCE.

Connecting the LRSI-F-21 Interface
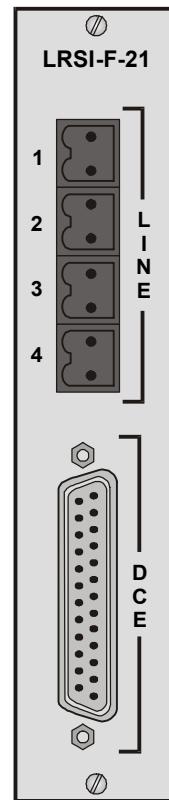
Figure 2-5. LRSI-F-21

➤ **To connect the LRSI-F-21 interface module:**

1. Connect the SHDSL cables terminated in terminal blocks into the card connectors marked LINE.

2. Connect the G.704 E1 unbalanced lines terminating in a 25-pin D-type female connector into the card connector marked DCE. Depending on the interface, use the following adapter cables available from RAD:

Table 2-3. LRSI-F-21 Interface Adapter Cables

Interface Type	Cable Number	Terminating Connectors
Unbalanced E1	**CBL-LRSI21/DB25/UB/M**	1 DB-25 to 8 male BNC coax
	CBL-LRSI21/DB25/UB/F	1 DB-25 to 8 female BNC coax

Connecting the LRSI-F-27 Interface
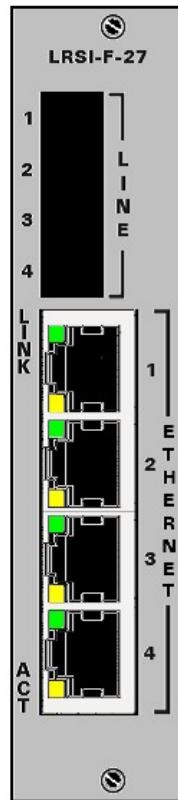
Figure 2-6. LRSI-F-27

➤ **To connect the LRSI-F-27 interface module:**

1. Connect the SHDSL cables terminated in terminal blocks into the card connectors marked LINE.

2. Connect the Ethernet lines terminating in RJ-45 connectors into the card connectors marked Ethernet.

For more details on the Ethernet interface see *Appendix C*.

Connecting the LRSI-F-28 Interface
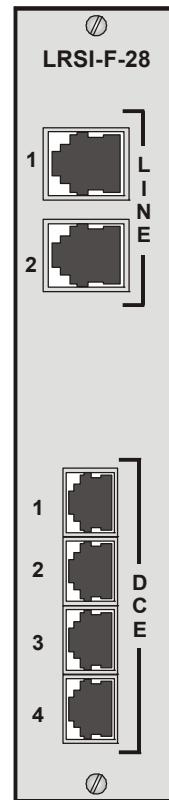
Figure 2-7. LRSI-F-28

➤ **To connect the LRSI-F-28 interface module:**

1. Connect the SHDSL cables terminated in RJ-45 connectors into the card connectors marked LINE.

2. Connect the G.704 E1/T1 balanced lines terminating in RJ-11 connectors into the card connectors marked DCE.

Connecting the LRSI-F-29 Interface
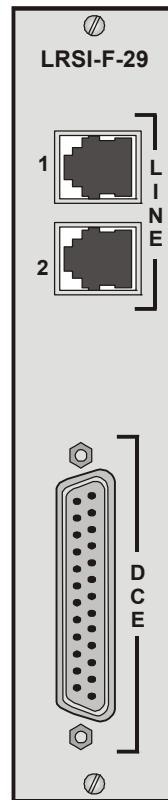
Figure 2-8. LRSI-F-29

➤ **To connect the LRSI-F-29 interface module:**

1. Connect the SHDSL cables terminated in RJ-45 connectors into the card connectors marked LINE.

2. Connect the G.704 E1 unbalanced lines terminating in a 25-pin D-type female connector into the card connector marked DCE. Depending on the interface, use the following adapter cables available from RAD:

Table 2-4. LRSI-F-29 Interface Adapter Cables

Interface Type	Cable Number	Terminating Connectors
Unbalanced E1	**CBL-LRSI21/DB25/UB/M**	1 DB-25 to 8 male BNC coax
	CBL-LRSI21/DB25/UB/F	1 DB-25 to 8 female BNC coax

Chapter 3

Operation

This chapter:

- Provides a description of the front panel controls and indicators
- Explains power-on and power-off procedures
- Provides instructions for using a terminal connected to the ASMi-52CQ control port
- Describes how to navigate menus.

3.1   Turning ASMi-52CQ On

➤ **To power on ASMi-52CQ:**

- Turn on the LRS-24 modem rack.

    After power-up, all LEDs turn on for 3 seconds while the CPU initiates the ASMi-52CQ module.

  After synchronization between the two modems has been achieved, the ASMi-52CQ module assumes the normal state according to the LED indications in *Table 3-2*.

  For other LED indications, see *Figure 3-1*.

  For troubleshooting, see *Chapter 5*.

3.2   Controls and Indicators

Front Panel LEDs

Figure 3-1 shows the front panel of the ASMi-52CQ module. *Table 3-1* lists the functions of the ASMi-52CQ front panel indicators.

POWER
○

DATA
1 ○   ○ 2
3 ○   ○ 4

TST
1 ○   ○ 2
3 ○   ○ 4

ALM
1 ○   ○ 2
3 ○   ○ 4

SYNC
○   ○
1   2

○   ○
3   4
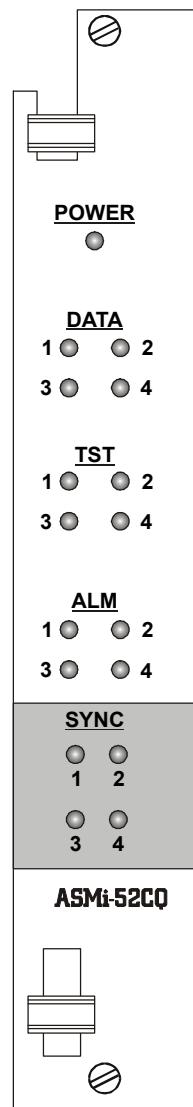
ASMi-52CQ

Figure 3-1. ASMi-52CQ Front Panel

Table 3-1. ASMi-52CQ Front Panel LEDs

ID	Color	Status	Indication
POWER	Green	ON	Power is On
DATA	Yellow	Blinking	Data is transmitted or received
		OFF	No data is transmitted or received
TST	Red	ON	Test mode is active in local or remote unit
		Blinking	Software download is in progress
ALM	Red	ON	Alarm active
SYNC	Green/ Red	ON (green)	Both modems are synchronized
		Blinking (red)	Synchronization is taking place
		ON (red)	Synchronization was lost between modems

Normal Operation

After power-up the LEDs should assume the states as shown in *Table 3-2*.

Table 3-2. Normal State of LEDs

ID	Color	State
POWER	Green	ON
DATA	Yellow	Blinking
TST	Red	OFF
ALM	Red	OFF
SYNC	Green/Red	Green

3.3   Initiating an ASCII Terminal Session

➤ **To enable an ASCII terminal session:**

1. Connect the terminal to the CM-2 RS-232 front connector of the LRS-24 chassis.

2. Power up the hub.

    The LRS-24 Main menu appears (see *Figure 3-2*). You are prompted for a password.

3. If a password has been assigned, type the password and press **‹Enter›**.
    If no password has been assigned (default), press **‹Enter›**.

    The **CM2›** prompt appears.

➤ **To select an option in the Main menu:**

1. Type the number corresponding to the option and press **‹Enter›**.

    The following message appears:

    Please enter the slot number (1-12)

2. Type the slot number of the ASMi-52CQ card and press **‹Enter›**.

    The screen for the selected command option appears.

```
              L       RRRRR     SSSS         222    4    4
              L       R   R     S           2   2   4    4
              L       RRRRR     SS    ----      2    444444
              L       R R        S           2          4
              LLLL    R  RR     SSSS        22222        4


                      RAD DATA COMMUNICATIONS LTD

Please Choose Command ID:
1.    System Configuration          12.    Modem/Hub Auto Configuration
2.    System Status                 13.    Modem Operation
3.    System manager list           14.    Modem Status
4.    System card type define       15.    Modem Diagnostics
5.    System Alarms                 16.    Modem Alarms
6.    System Log-file               17.    Modem Log-file
7.    System control port           18.    Modem Download
8.    System Download               19.    Modem Parameters
9.    System management access      20.    Modems SW Version
10.   System Dial out modem         21.    Help
11.   System Reset
CM2 >
```

Figure 3-2. LRS-24 Main Menu

3.4   Navigating the Menus

The menus are navigated using the keystrokes described in *Table 3-3.*

Table 3-3. Keys to Navigate Menus

Key	Function
‹Tab›	Moving from field to field. Pressing ‹Tab› in the last field brings the cursor back to the first field on the screen.
‹F› or ‹U›	Viewing the next parameter value in the list
‹B› or ‹D›	Viewing the previous parameter value in the list
‹Enter›	Saving parameter values and exiting the screen
‹Esc›	Exiting the screen without saving parameter values

The table below describes the menus and screens used to perform common configuration functions.

Table 3-4. Configuration Menus and Screens

LRS-24 Main Menu Item	Screen Name	Function
Modem Operation	Modem Advanced Setup	Setting operational parameters. This screen is needed to switch control or to load configurable parameters from one modem to the other
Modem Parameters	Modem Setup	Configuring parameters of both modems
Modem Status	Modem Status	Viewing types of both digital and line interfaces and LED indications, also the modem's current software and hardware version.
Modem Log-file	Modem Log File	Viewing a list of timed events for the local and remote modems
Modem Diagnostic	Modem Diagnostic	Invoking loopback connections, and LEDs test
Modem Alarm	Modem Alarm Status	Viewing modem alarm messages and states

3.5   Turning ASMi-52CQ Off

➤ **To power down ASMi-52CQ:**

- Remove the ASMi-52CQ card from the rack

  Or

- Turn off the LRS-24 modem rack.

Chapter 4

Configuration

This chapter describes how to configure the ASMi-52CQ modem installed in the LRS-24 hub using an ASCII terminal. It briefly describes basic modem configuration. Refer to *Appendix C* for a more detailed description of modem setup commands. The following items are described in this section:

- Selecting menu options

- Configuring the modem.

4.1   Introduction

The terminal is used to configure, monitor and perform diagnostic tests of the LRS-24 chassis and modems installed in it. Specific screens are used for each of these management operations.

The ASCII terminal operations for the LRS-24 hub are described in the LRS-24 installation and operation manual. That manual provides instructions for:

- Accessing various terminal screens

- Configuring control parameters

- LRS-24 management operations.

The LRS-24 management screens available through the ASCII terminal handle the hub functions for:

- IP management network

- LRS-24 chassis status.

The LRS-24 hub screens also provide information on modems installed in the chassis and their alarm status (see *Table* 4-1).

Note   *For SNMP RADview operation, refer to the RADview user's manual.*

Table 4-1. LRS-24 Screens

Screen	Indication
LRS-24 Cards	Slot number in chassis where a modem is installed and type of SNMP management associated with the module, via either on-board agent (SMOD) or CM-2 agent (IMOD). ASMi-52CQ is IMOD type modem.
Hub Alarm	Activity status of alarms for modems installed in chassis. To view the active alarm associated with a specific modem, enter the Modem Alarms Status screen. For details regarding the ASMi-52CQ alarms, refer to *Chapter 4*.
Hub Log File	Time and date of changes in chassis status, such as modem removal from or insertion to chassis.

4.2   Configuring the Modem

The initial configuration of the ASMi-52CQ modem includes the following steps:

1. Accessing the Modem Setup menu

2. Configuring the clock source

3. Configuring the DTE interface:

    ▪ Serial interface: Configure the data rate

    ▪ E1/T1 interface: Go to the Modem Setup menu: E1/T1 Parameters menu and configure the E1/T1 parameters

4. Configuring the line parameters: Go to the Modem Setup Menu: Line Parameters screen and configure the line parameters.

The instructions given below cover only the initial configuration procedure. Refer to *Appendix C* for the detailed descriptions of ASMi-52CQ commands.

➤ **To access the Modem Setup menu:**

1. In the Main menu, select **Modem Parameters** and press ‹**Enter**›.

    The following message appears:

    Please enter the slot number (1-12)

2. Type the slot number of the ASMi-52CQ card and press ‹**Enter**›.

    The Modem Setup menu appears.

Configuring the Clock Source

Clocking for ASMi-52CQ can come from four different sources:

• Station – clocking comes from the LRS-24 system clock

• External – clocking comes from the user port, service, or DTE interface

• Receive – clocking is taken from the DSL line

- Internal – clocking comes from its internal oscillator (also known as master clocking).

Figure 4-1 illustrates the various clock sources.
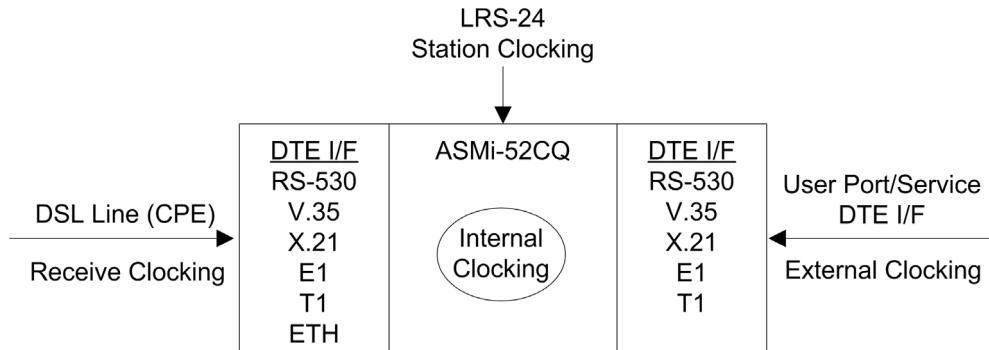
Figure 4-1. ASMi-52CQ Clock Sources

The clock source of each line in ASMi-52CQ can be configured separately with the following restrictions:

- External clocking cannot be used for Ethernet.

- When receive clocking is configured for one line, all lines must use receive clocking

- When using ASMi-52CQ as CPE it must be configured to receive clocking.

➤ **To configure the clock source:**

- In the Modem Setup menu, move the cursor to **CLOCK SOURCE LOC/REM** field by pressing ‹**Tab**› and select the clock source for the selected modem.

Configuring the DTE Interface

To configure the ASMi-52CQ DTE interface (serial or E1/T1), refer to the appropriate section below. See *Appendix C* for explanations of the parameters.

Configuring the Serial Interface

➤ **To configure the serial interface:**

- In the Modem Setup menu, move the cursor to **DATA RATE** field by pressing ‹**Tab**› and select the desired transmission rate by pressing ‹**F**› or ‹**B**›.

Configuring the E1 Interface

➤ **To configure the E1 parameters:**

1. In the Modem Setup menu, move the cursor to **NEXT PARMETERS (E1)** field by pressing ‹**Tab**› and select **YES** by pressing ‹**F**› or ‹**B**›.

    The Modem Setup menu: E1 Parameters screen appears.

2. Configure the following E1 parameters:

    - Framed mode

Note
- *If the **opposite** modem is E1, then the Framed Mode value can be G732N, G732S Transparent, or Unframed.*
- *If the **opposite** modem is Serial DTE or LAN, then the Framed Mode value can be G732N, or Unframed*
- *If Frame Mode is Unframed, then all the rest of the parameters are disabled.*

- Sync mode
- CRC-4
- Idle Code
- Timeslot Assign
- Unit Identical Set
- First timeslot for remote E1 – define the first timeslot for the remote E1 unit.

Configuring the T1 Interface

1. In the Modem Setup menu, move the cursor to **NEXT PARMETERS (T1)** field by pressing **‹Tab›** and select **YES** by pressing **‹F›** or **‹B›**.

   The Modem Setup menu: T1 Parameters screen appears.

2. Configure the following T1 parameters:

   - Framing mode
   - Line coding
   - Idle Code
   - Timeslot Assign
   - Unit Identical Set
   - Receive gain
   - Interface
   - Transmit signal mask
   - Fbit configuration.

Configuring the Line Parameters

➤ **To configure the Line parameters:**

1. If you have configured E1/T1 parameters, press **‹ESC›** to return to the Main menu, and then repeat the steps above to access the Modem Setup menu.

2. In the Modem Setup menu, move the cursor to **NEXT PARMETERS (LINE)** field by pressing **‹Tab›** and select **YES** by pressing **‹F›** or **‹B›**.

   The Modem Setup menu: Line Parameters screen appears.

3. Configure the following line parameters:

   - Power backoff
   - Snext margin, if line probing is set to adaptive

▪ Current margin, if line probing is set to adaptive

▪ Power spectral density (line probing set to fixed only)

▪ Line probing

▪ Transmission mode

▪ Loop attenuation threshold

▪ SNR margin threshold.

4.3   Memory Downloading

CPU and Memory Elements

Flash Memory

The ASMi-52CQ flash includes the following elements:

- **Boot flash memory –** Contains the Boot program, essential for the modems initial operations.
- **Flash memory –** Contains the application program in a compressed state. The boot program decompresses the application to the DRAM.
- **DRAM** – Contains the application while it runs, and all the data and variables the program requires for operation.
- **Peripherals –** Include the SHDSL chipset, the LEDs and other on-board components. The CPU can access these components.
- **CPU** – The main processing unit of the modem – responsible for all control, monitoring and operation of the modem.
- **FPGA –** Responsible for glue logic and proprietary timing implementations.

The CPU first runs the Boot program from the Boot flash. The Boot program then decompresses one of the two compressed application programs stored in the Flash memory to the DRAM. The uncompressed program runs from the DRAM, and loads the FPGA. This enables the CPU to access all the peripheral devices and begin to run the modem.
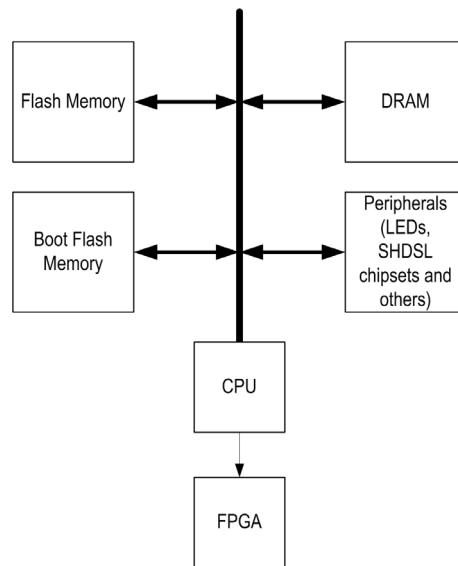
Figure 4-2. Memory Map

Download Procedure

The download function updates the latest software version that exists in the CM-2. The new software is stored (replacing the oldest version stored) in the Flash memory.

The CM-2 modules with software version 4.0 store up to three different software release files. Previous CM-2 modules store a single software release file for ASMi-52CQ.

New software releases are distributed as ***.img** files.

The software download procedure consists of the following stages:

- Software download to the CM-2 module from the management station using TFTP or XMODEM protocol (see *Downloading via LAN* and *Downloading via XMODEM* sections).

Software download from the CM-2 to a single ASMi-52CQ card (see *Downloading via CM-2 Flash* section) or to all the ASMi-52CQ modems simultaneously (see *Downloading a New Software Version to All the ASMi-52CQ Modems* section).

Defining Type of Download

➤ **To define type of download:**

1. From the Main Menu, select **Modem Download**.

2. Select the ASMi-52CQ slot and define the modem that you intend to configure.

    The screen shown in *Figure* 4-3 appears.

3. Select a number for type of download.

```
DOWNLOAD MAIN MENU
1. Modem Download via LAN

2. Modem Download via XMODEM

3. Modem Download via CM2 FLASH

4. Modem Download via MODEM FLASH

5. Change Modem Software Version

6. View Existing Versions of Modem
Enter download option number ___>
```

Figure 4-3. Download Main Menu

Downloading via LAN

When this option is selected, the new software file is transferred from a server to the CM-2, using the TFTP protocol.

➤ **To download via LAN:**

1. From the Modem Download menu, select **Modem Download via LAN**.

   The Download via LAN menu appears (see *Figure* 4-4).

2. Enter IP address of TFTP server and file name.

3. Press **‹Enter›**.

   The file is transferred via the Ethernet connection of the CM-2, using the TFTP protocol.

```
Download via LAN
IP Address of TFTP server: 000.000.000.000
File name: Insert file name for download
Remote modems: N/A
```

Figure 4-4. Download via LAN Menu

Downloading via XMODEM

When this option is selected, the new software file is transferred from a server to the CM-2, using the XMODEM protocol.

➤ **To download via XMODEM:**

1. From the Download Main menu, select **CM2 or Modems Download via XMODEM**.

2. After typing the parameter data, press **‹Enter›** to start the download process.

3. Start the XMODEM server, when CM-2 displays the following message:

   The CM-2 is waiting to the XMODEM data. Start the process within one min.

   If after one minute the XMODEM server has not connected properly to the CM-2, the message **The download action has failed** appears.

```
Download via XMODEM
------------------
Remote modems: N/A
```

Figure 4-5. Download via XMODEM Menu

Downloading via CM-2 Flash Memory

This option should be used when the **CM-2 already contains a new software file** that you want to download to the modem.

➤ **To download via CM-2 Flash memory**

1. Select **Modem Download via CM2 FLASH** from the Modem Download menu.

   A menu with a list of the available software versions that reside in the CM-2 flash memory appears (see *Figure* 4-6).

2. Select one of the versions by pressing ‹**F**› or ‹**B**›.

3. Select N/A for Download to Remote Modems (see *Figure* 4-6) and press ‹**Enter**›.

   The downloading process begins. All the TST LEDs of the corresponding ASMi-52CQ module start blinking.

```
MODEMS DOWNLOAD via CM2 FLASH
CM2 containing the following versions:
ID    Modem Type    Version No.              Date        Size    Location
1     ASMi-52CQ     0.2                      2000-6-6    230k    FLASH2
2     NULL          0.0                      0-0-0         0k    EMPTY
3     NULL          0.0                      0-0-0         0k    EMPTY


Please choose the ID number
ID NUMBER: 1
Download to Remote Modems: N/A
to change the ID number press f to scroll forward
or b to scroll backward
```

Figure 4-6. Modem Download via CM2 Flash Memory

Changing Modem Software Version

➤ **To change modem software version:**

1. Select **Change Modem Software Version** from the Modem Download menu.

   A screen appears with a list of the available software versions that reside in the modem flash. The first version in the list is the one that is currently running (see *Figure* 4-7).

2. Select modem which software version you want to change by pressing ‹**F**› or ‹**B**›.

3. Select the ID NUMBER of the new modem software version by pressing ‹**F**› or ‹**B**›.

4. Press ‹**Enter**›.

```
CHANGING MODEM'S VERSION
              MODEM NAME: ASMi-52CQ
MODEM STATUS  : MASTER PERMANENT
SELECT MODEM  : MODEM 1 LOCAL
Modem containing the following versions:
ID              Version No.        Date
1               0.2                2000-6-6
2               0.2E1              2001-2-22
3               0.0                0-0-0


Please choose the ID number
ID NUMBER: 1
to change the ID number press f to scroll forward
or b to scroll backward
```

Figure 4-7. Changing Modem Version

Viewing Existing Versions of Modem Software

This display is the same as Change Modem Software Version screen, however it can only be viewed. You cannot select a new version with this option.

➤ **To view existing versions of modem software:**

1. Select **View Existing Versions of Modem** from the Modem Download menu.

2. Select modem which software version you want to display and press **‹Enter›**.

    A screen with a list of the available software versions that reside in the MODEM flash appears. The first version in the list is the version that is currently running (see *Figure* 4-8).

```
VIEW MODEM VERSIONS ON MODEM'S FLASH
          MODEM NAME: ASMi-52CQ
MODEM STATUS  : MASTER PERMANENT
SELECT MODEM  : MODEM 1 LOCAL
Modem containing the following versions:
ID            Version No.    Date
1             0.2            2000-6-6
2             0.2E1          2001-2-22
3             0.0              0-0-0
```

Figure 4-8. View Modem Versions in Modem Flash

Downloading a New Software Version to All the ASMi-52CQ Modems

To download a new software version to all the ASMi-52CQ modems, use the procedures described in the previous sections to download the same software version to all ASMi-52CQ modems in the LRS-24 hub.

➤ **To download a new software version to all ASMi-52CQ modems:**

- From the Download Main menu, type 1, 2, or 3, according to the required type of download.

Chapter 5

Troubleshooting and Diagnostics

This chapter describes the ASMi-52CQ diagnostic functions, which include:

- Diagnostic tests (loopbacks, LEDs test)
- Status indications, alarms
- SHDSL performance diagnostics
- Troubleshooting procedures.

5.1 Introduction

ASMi-52CQ offers diagnostics for troubleshooting:

- **V.54 loopbacks** – Local analog and remote digital loopbacks needed to isolate a failure to a particular element of the transmission system
- **Alarm buffer** – Contains alarm messages regarding the status of the transmission system.

All diagnostics options can be invoked from the RADview SNMP management tool or an ASCII terminal. A combination of the above diagnostics tests is also possible. Then, examine the alarm buffer messages for any transmission error or configuration mismatch. When you set a test for one modem of ASMi-52CQ, no parameters for this modem can be changed, except to disable the specific test. Once the line is disconnected, or one of the units is reset, the diagnostics stop.

Note   *In all diagnostics functions the clock mode remains unchanged, in order to avoid interfering with the other channels.*

5.2   Monitoring Performance

Displaying SHDSL Performance

ASMi-52CQ has capabilities for collection of SHDSL parameters performance diagnostics. The statistics are accessed via the RADview SNMP management parameters tool. The parameters are listed in *Table 5-1.*

Table 5-1. ASMi-52CQ Performance Monitoring Parameters for Current Time

Display	Description
Current ES	Number of errored seconds in which one or more CRC (Cyclic Redundancy Check) error events occurred during the current interval. This value is updated every second.
Current UAS	Number of unavailable seconds in which a failed signal occurred during the current interval. This value is updated every second.
Current SES	Number of severely errored seconds in which 832 or more CRC error events occurred during the current interval. This value is updated every second.
Current LOSWS	Number of seconds with loss of sync word during the current interval. This value is updated every second.
Current total CRC	Number of CRC error events recorded since the last time the register was cleared.
Current TIMER	Time in seconds from the beginning of the interval. This value is updated every second.

Displaying E1/T1 Performance

When ASMi-52CQ includes G.704 E1/T1 port, the modem has capabilities for collection of the E1/T1 performance diagnostics. The statistics are accessed via the RADview SNMP management parameters tool. Statistics collection depends on the use of the CRC-4 function:

* **CRC-4 Enabled (E1), ESF Framing (T1)**

    When the CRC-4 function is enabled or when T1 is in ESF Framing mode, it is possible to monitor the data transmission performance end-to-end. The error detection is derived from the data payload by performing a cyclic redundancy check (CRC). The resulting CRC checksum is transmitted in addition to the raw data bits. The receiving end recalculates the checksum and compares the results with the received checksum: any difference between the two checksums indicates that one or more bits are contained in the current data block being evaluated.

* **CRC-4 Disabled (E1), SF Framing (T1)**

    When the CRC-4 option is disabled or when T1 is in SF Framing mode, ASMi-52CQ does not support the capabilities listed above. However, the modem is capable of providing statistics of the bipolar violations.

Table 5-2. E1/T1 Performance Monitoring Parameters

Display	Description
BPV last minute	Number of BPV events detected in the last minute
BPV worst minute	Number of BPV events detected in the worst minute
Sync/Sync Loss (E1/T1 status)	Framed operation – loss of frame alignment, unframed operation – loss of signal
CRC error events	Number of CRC error events recorded since the last time the register was cleared.
CRC avg error events	The average number of CRC events per second.
Current ES	Number of errored seconds in which one or more CRC error events occurred during the current interval. This value is updated every second.
Current UAS	Number of unavailable seconds in which a failed signal occurred during the current interval. This value is updated every second.
Current SES	Number of severely errored seconds with 832 or more CRC error during the current interval. This value is updated every second.
Current BES	Number of seconds with 2 to 831 CRC events during the current interval. This value is updated every second.
Current LOFC	Number of loss of frame events measured during the current interval.
Current CSS	Number of seconds with one or more controlled slip events measured during the current interval.
Current TIMER	Time in seconds from the beginning of the interval. This value is updated every second.
24 hour ES	Number of ES measured during the last 24 hours. This value is updated every 15 minutes.
24 hour UAS	Number of UAS measured during the last 24 hours. This value is updated every 15 minutes.
24 hour SES	Number of SES measured during the last 24 hours. This value is updated every 15 minutes.
24 hour BES	Number of BES measured during the last 24 hours. This value is updated every 15 minutes.
24 hour LOFC	Number of LOFC measured during the last 24 hours. This value is updated every 15 minutes.
24 hour CSS	Number of CSS measured during the last 24 hours. This value is updated every 15 minutes.
Current degrade minute	Number of degraded minutes, in which the bit error rate exceeded 1×10^{-6}, in the current interval. This value is updated every 1 minute.
24 intervals	Number of 15 min. intervals the device has been working since power up, the value is from 0 to 96.
Last 24 degrade minutes	The last 24 hour count of the degraded minutes. This value is updated every 24 hours.

5.3   Handling Alarms

ASMi-52CQ alarm buffer stores system alarm records, which can be viewed on either an ASCII terminal (see below) or an SNMP management tool. When one or more alarm records appear in the buffer, the front panel ALM LED lights up. After the alarm is cleared, the ALM LED turns off.

Viewing Alarm Messages from an ASCII Terminal

The MODEM ALARM STATUS screen (*Figure 5-1*) enables viewing messages stored in the alarm buffer of ASMi-52CQ and remote modems. The screen also shows synchronization loss and DTE loopback signaling states.

➤   **To view the ASMi-52CQ alarms:**

1. From the Main menu, select **Alarm Status**.

2. Select the ASMi-52CQ slot.

    The MODEM ALARM STATUS screen shown in *Figure 5-1* appears. This screen displays the general alarms of ASMi-52CQ.

3. To view E1/T1/T1 alarms, change **Next Alarm (E1/T1)** value to **ON** and press **‹Tab›** to display next alarm screen (available only for ASMi-52CQ with G.704 E1/T1 interface).

    The screen shown in *Figure 5-2* appears.

4. To view SHDSL line alarms, change **Next Alarm (LINE)** value to **ON** and press **‹Tab›**.

    The screen shown in *Figure 5-3* appears.

```
MODEM ALARM STATUS
                        MODEM NAME : ASMi-52CQ
DEFINE MODEM PORT NUMBER      : 1
SELECT MODEM              : MODEM 1 LOCAL
LINE DISCONNECT           : OFF
REMOTE MODEM POWER OFF : OFF                        STUFFING OVERFLOW EXC
                          : OFF
TRANSMIT CARRIER          : OFF NVRAM FAILED         : OFF
RECEIVE CARRIER           : OFF PROP PROTOCOL FAILED    : OFF
LLB BY DTE                : OFF SOFTWARE DWL IN PROCESS   : OFF
RLB BY DTE                : OFF INCOMPATIBLE CONNECTORS   : OFF
SYNC LOSS   A             : ON  SYNC LOSS   B           : OFF
CRC6 ERR EXC A            : OFF                    CRC6 ERR EXC B      :
OFF
CONFIGURATION MISMATCH : OFF PHASOR OVERFLOW EXC       : OFF
ILLEGAL EXTERNAL CLOCK SOURCE                       : OFF   WRONG
CONNECTION                  : OFF
NO MANAGEMENT LINK      : OFF XILINX FAILED           : OFF
NO MODEM PORT (IR)      : OFF LAN NOT CONNECTED       : OFF
NO FIBER INTERFACE      : OFF NO EXT CLK INPUT        : OFF
IR RATE MISMATCH        : OFF ILL. CLK-ERR            : OFF
SELF TEST FAILED        : OFF OLD REM VERSION         : OFF
MINOR ALARM-AIS-ELEC   : OFF AIS-OPT                 : OFF
MAJOR ALARM-LINE DISCON.-ELEC                       : OFF   LINE DISCON. –
OPT                          : OFF
NEXT ALARMS(E1/T1)     : OFF NEXT ALARMS(SHDSL)      : OFF
```

Figure 5-1. Modem Alarms Status Screen

```
MODEM ALARM STATUS
                        MODEM NAME : ASMi-52CQ
DEFINE MODEM PORT NUMBER      : 1
SELECT MODEM              : MODEM 1 LOCAL
E1 SIGNAL LOSS            : OFF E1 BPV ERR. EXC                : OFF
E1 FRAME SLIP EXC         : OFF E1 EXECIVE BPV                 : OFF
E1 CRC4 ERR. EXC          : OFF E1 EXECIVE ERR. RATIO    : OFF
E1 AIS OCCURED            : OFF E1 AIS RED ALARM               : OFF
E1 RED ALARM              : OFF E1 CRC MF ERR. EXC       : OFF
E1 YELLOW ALARM           : OFF E1 SYNC LOSS                   : OFF
E1 LOCAL MF               : OFF E1 REMOTE MF                   : OFF
E1 REM SIGNAL LOSS        : OFF E1 TS RATE MISMATCH      : OFF
E1 TS NOT COMP            : OFF E1 TS NOT *128                 : OFF
```

Figure 5-2. Modem Alarm Status Example (E1 Alarms)

```
MODEM ALARM STATUS
                    MODEM NAME : ASMi-52CQ
DEFINE MODEM PORT NUMBER    : 1
SELECT MODEM              : MODEM 1 LOCAL
LOOP ATTN A              : OFF LOOP ATTN B                    : OFF
SNR MARGIN A             : OFF SNR MARGIN B                   : OFF
LOSW FAIL A              : OFF LOSW FAIL B                    : OFF
INCOMPATIBLE DATA RATE : OFF INCOMPATIBLE PSD                 : OFF
WIRE NOT COMPATIBLE    : OFF
```

Figure 5-3. Modem Alarm Status (SHDSL Alarms)

Table 5-5 lists the ASMi-52CQ alarms in alphabetical order. *Table 5-4* explains how to use alarms for troubleshooting.

Table 5-2. ASMi-52CQ Alarms and Warnings

Terminal Message	Alarm Type	Description	Severity
LINE DISCONNECT	General	The line has been disconnected	Major
REMOTE MODEM POWER OFF	General	Remote modem power disconnected	Major
LLB BY DTE	General	Local loopback has been activated by physical connector (not relevant for units with X.21 DTE interface only)	Warning
SOFTWARE DWL IN PROGRESS	General	Software download is in progress	Warning
RLB BY DTE	General	Remote loopback has been activated by physical connector (not relevant for units with X.21 DTE interface only)	Warning
SYNC LOSS LINE A	SHDSL	SHDSL line A is nor synchronized	Major
CRC6 ERR EXC A	SHDSL	Excessive CRC-6 errors have been detected on SHDSL line A	Minor
ILLEGAL EXTERNAL CLOCK SOURCE	General	External clock source failed.	Major
NO MANAGEMENT LINK	General	Failure of inband management via the EOC	Major
NO MODEM PORT (IR)	General	The LRSI interface module is absent	Major
SELF TEST FAILED	General	Failure occurred during self-test	Major
PROP PROTOCOL FAILED	General	The proprietary embedded management channel between ASMi-52CQ and remote devices has failed	Major
MINOR ALARM-AIS-ELEC	DTE	AIS and loss of frame alignment are detected	Minor
E1/T1 SIGNAL LOSS	DTE	E1/T1 loss is detected at the DTE port	Minor
E1/T1 BPV ERR EXC	DTE	E1/T1 bipolar violation errors exceed threshold	Major

Terminal Message	Alarm Type	Description	Severity
E1/T1 FRAME SLIP EXC	DTE	E1/T1 frame slips exceed the threshold	Minor
E1/T1 EXCESIVE BPV	DTE	Bipolar violations rate exceeds 1×10^{-6} during the last 1000 seconds	Major
E1 CRC-4 EXC	DTE	CRC-4 errors exceed the threshold	Major
E1/T1 EXCESIVE ERR RATIO	DTE	The bit error rate of the link exceeds 10^{-3}	Major
E1/T1 AIS OCCURED	DTE	AIS is detected at the E1/T1 port	Major
E1/T1 AIS RED ALARM	DTE	AIS and loss of frame alignment are detected	Major
E1/T1 RED ALARM	DTE	E1/T1 loss of frame synchronization occurred (shown on terminal)	Major
E1 SYNC LOSS	DTE	E1 loss of frame synchronization occurred (shown in CM2)	Major
E1 CRC MF ERR. EXC	DTE	CRC errors detected in the frame synchronization signal exceeded the threshold	Major
E1/T1 YELLOW ALARM	DTE	Local loss of frame synchronization	Major
E1/T1 REMOTE SIGNAL LOSS	DTE	E1/T1 signal loss is detected at remote ASMi-52	Major
E1/T1-TS NOT RATE COMP	SHDSL	Current line rate does not support the number of assigned E1/T1 timeslots	Minor
E1/T1 TS NOT X128	SHDSL	Line A loop attenuation has exceeded the alarm threshold	Minor
LOOP ATTN A	SHDSL	Line B loop attenuation has exceeded the alarm threshold	Minor
SNR MARGIN A	SHDSL	Line A signal-to-noise margin has exceeded the alarm threshold	Minor
LOSW FAILURE A	DTE	Loss of Sync Word is detected on line A	Major
INCOMPATIBLE DATA RATE	DTE	Mismatch in the line rate and data rate. Applicable for the ASMi-52CQ units with V.35 interface operating in adaptive rate mode	Major

5.4   Troubleshooting

Using LEDs

You may locate and correct some failures by using the front panel LEDs (see *Table 5-3*). *Table 5-4* lists the alarm buffer messages, seen on the ASCII terminal or the RADview SNMP management tool.

Table 5-3. Using LEDs for Troubleshooting

Symptom	Possible Failure	Corrective Action
POWER LED is OFF	Blown fuses	Replace fuses (remove ASMi-52CQ from the hub)
SYNC is red (modem is not synchronized)	Line connection between modems	Check line and line connection between modems
Modems are synchronized but DATA LED is OFF (information is not transferred)	Modem to DTE connection	Check connection between modem and DTE
ALM LED is On		See *Table 5-4*

Using the Alarm Buffer

➤   **To use the alarm buffer for troubleshooting:**

1. When the ALM LED is ON, connect the RADview management tool or an ASCII terminal to view the alarm buffer messages.

2. Enter the Modem Alarm Status screen and watch the alarm states.

    ON indicates an active alarm.

Table 5-4. Using Alarm Buffer for Troubleshooting

Symptom	Possible Failure	Corrective Action
ALM LED is ON and SYNC LOSS LINE A alarm is stored in the alarm buffer	Line between modems is not properly connected	Verify and connect the line properly; verify the units' clock type
ALM LED is ON and NO MANAGEMENT LINK alarm is stored in the alarm buffer	Line between modems has exceeded its maximum range; or the line quality is poor	Replace unit or contact RAD's Technical Support
ALM LED is ON and SELF TEST FAILED alarm is stored in the alarm buffer	Hardware failure	Replace unit
ALM LED is ON and NO MODEM PORT alarm is stored in the alarm buffer	Digital interface is missing, or digital interface is not supported by modem	Mount required digital interface on the ASMi-52CQ module

5.5   Testing ASMi-52CQ

The user-controlled test functions of ASMi-52CQ consist of the loopback tests, BER test and LEDs tests. The purpose of these tests is to determine the source of a break in the data flow.

The Modem Diagnostic screen enables you to configure loopback connections, and initiate LEDs test.

Initiating Loopback and LED Tests

➤ **To initiate loopback or LED tests:**

1. From the Main menu, select **Modem Diagnostics**.

2. Select the ASMi-52CQ slot.

The Modem Diagnostics menu appears.

```
MODEM DIAGNOSTICS
                    MODEM NAME: ASMi-52CQ
DEFINE MODEM PORT NUMBER        : 1
 MODEM STATUS                   : MASTER PERMANENT
 SELECT MODEM                   : MODEM 1 LOCAL
 LOOP & BERT                    : CANCEL   LOOP TIMEOUT(MIN)        : N/A
 REMOTE DIG ENABLE              : N/A      LOOP TIMEOUT(0-4095 MIN): 5
 BERT RESULTS                   : 0.0 E- 00
 LED TEST                       : OFF
 LOCAL LOOP BACK                : DISABLE
 REMOTE LOOP BACK               : DISABLE
 REMOTE DIG                     : N/A
 ENABLE TEST FROM REM MODEM     : N/A
 BERT ERR INJECTION             : NO ERR
 BERT PATTERN                   : MARK
 BERT CLEAR COUNTERS            : NO
```

Figure 5-4. Modem Diagnostic Menu

Rows in **bold** in the figures indicate parameters applicable to ASMi-52CQ and standalone modems. Additional, non-bolded parameters listed on a screen apply to other modems installed in the LRS-24 hub.

The Modem Diagnostics screen fields and the options for each field are explained in *Table 5-5.*

Table 5-5. Modem Diagnostics Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Identifies the modem type which status is being viewed or modified	ASMi-52CQ	Master ASMi-52CQ
			ASMi-52	Standalone ASMi-52 remote modem
MODEM STATUS	Read	For viewing configuration mode	MASTER PERMANENT	The modem controls its own configurable parameters
SELECT MODEM	Write	Selects the modem which diagnostic parameters you set using this screen.	MODEM1 LOCAL MODEM2 LOCAL MODEM3 LOCAL MODEM4 LOCAL	Operational parameters will be set for one of the modems installed in the LRS-24 chassis
			MODEM1 REMOTE MODEM2 REMOTE MODEM3 REMOTE MODEM4 REMOTE	Operational parameters will be set for one of the remote modems
LOOP & BERT	Write	Selecting the loopback operation	ANA	Local loopback is initiated
			REM	Remote loopback is initiated
			CANCEL	Diagnostic loopback is cancelled

Note: *Activating remote loopback from a remote modem is available for ASMi-52 modems with software revision 1.12 or higher.*

LOOP TIMEOUT	Write	Sets the period of time after which the LLB automatically deactivates	0–4095 min	*Note: When activating LLB on the remote modem, the "0" value of the LOOP TIMEOUT parameter is not available.*
LED TEST	Write	Initiating LED test	ON OFF	All LEDs turn on for 3 secs.
BERT PATTERN	Write	Sets the BERT pattern	2E15-1 MARK SPACE ALTERNATE	

When a test is active, no other test can be activated for the current modem. For details regarding loopback definitions, refer to *Section 5.5.*

When setting a loopback connection from the terminal, both the SELECT MODEM and LOOP & BERT fields determine the transmission path. For example, a remote loopback (REM) from the remote (ASMi-52 standalone) modem sets a digital loopback in the local modem (see *Figure 5-5*).

Setting Loopback Tests

ASMi-52CQ supports the local analog loopback, remote digital loopbacks as per ITU V.54.

V.54 loopback connections are set from the RADview SNMP management tool or from an ASCII terminal (see *Section 5.2*) The TST LED on the front panel of the local unit lights up and remains lit while the loopback is being run.

The loopback is activated separately for each modem on the ASMi-52CQ card; therefore, you can run loopback for different modems on the card simultaneously.

The loopback test runs until the timeout period has passed or the test is cancelled (see *Table 5-5*). You cancel running a loopback from the RADview SNMP management tool or from an ASCII terminal (see *Section 5.2*). Once a loopback is cancelled, the TST indicators turn off. In case of the LLB, synchronization between the modems is restored within a few minutes.

Running the Local Analog Loopback

The local analog loopback (LLB) checks the performance of the local ASMi-52CQ modem, the local DTE and connection between them (see *Figure 5-5*).

The LLB can be performed separately on the local and remote modems.

LLB of the local unit is activated either from the terminal or from the SNMP management tool. LLB is activated separately per port.

LLB of the remote unit is activated per port from the remote DTE, from the terminal, or from the SNMP management tool.

ASMi-52CQ allows you to set the LLB timeout causing the loopback to deactivate automatically after the desired period of time (see *Table 5-5*).
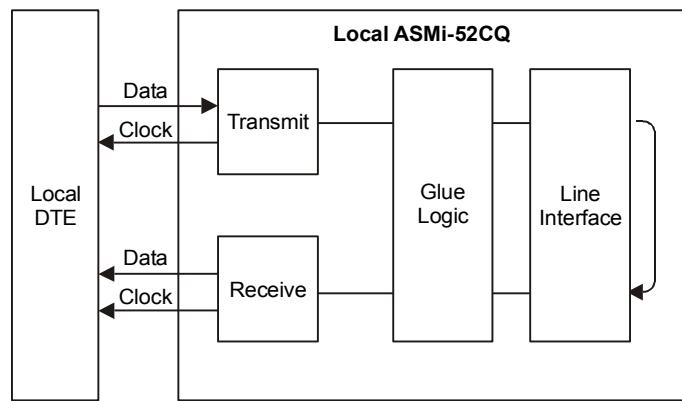
Figure 5-5. Local Analog Loopback (LLB)

Running the Remote Digital Loopback

The remote digital loopback (RLB) checks the performance of both the local ASMi-52CQ and remote ASMi-52 modems, and the lines connecting them (see *Figure 5-6*).

RLB can be activated from the remote standalone ASMi-52 with software revision 1.12 or higher.
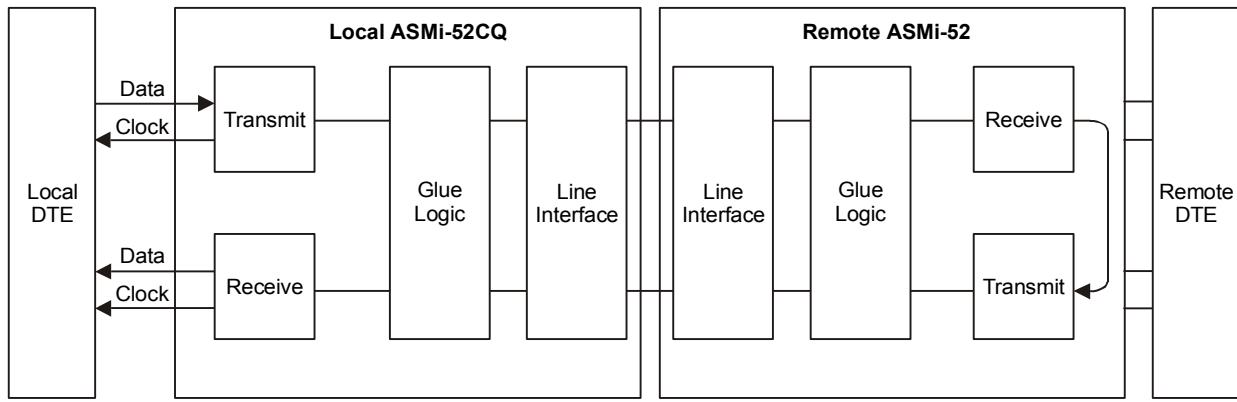
Figure 5-6. Remote Digital Loopback (RLB)

Running the Bit Error Rate Test (BERT)

It is possible to generate BERT+RLB or BERT tests (from both CO and CPE) in E1 and DTE Serial units. These tests can be set only if there is a connection to the FE unit. Both tests (BERT+RLB and BERT) check the performance of the SHDSL lines connecting the local and remote units and can be activated opposite the remote standalone ASMi-52 with software revision 2.12 or higher. *Figure 5-7* and *Figure 5-8* show the BERT+RLB test and BERT test, respectively.
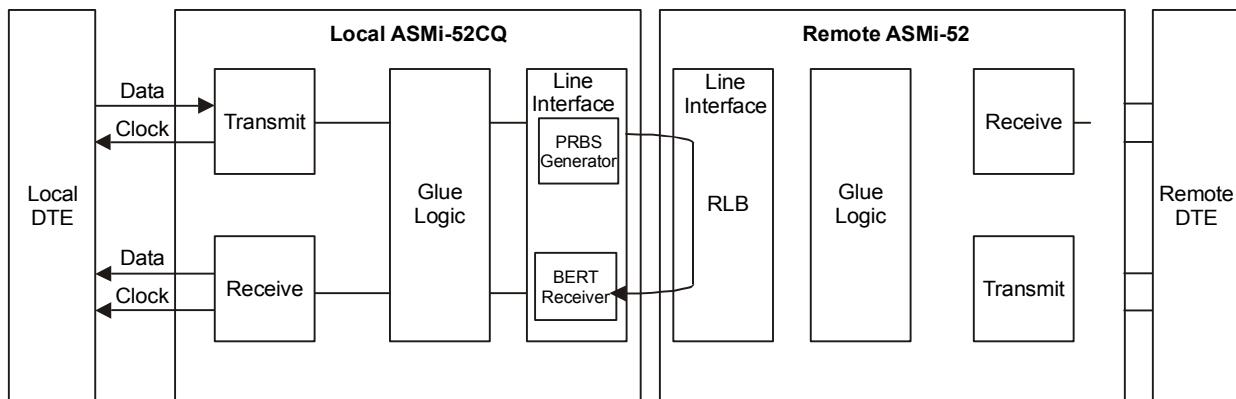
Figure 5-7. Remote Digital Loopback + BERT Test
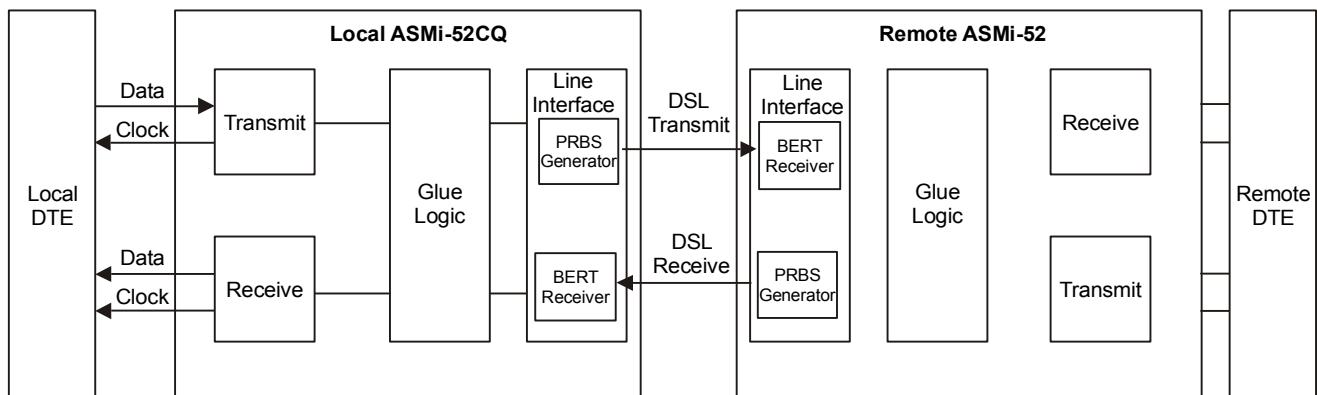
Figure 5-8. BERT Test

The following are the BERT test patterns that can be selected:

- 2E15-1

- Mark

- Space

- Alternate

BERT has a possible Single Error injection only.

The BERT performance counters are as follows:

- BERT Error bits – the total number of bit errors detected

- BERT run time – the total time the test is running in seconds

- Bert error seconds – the total number of seconds in which errors have been detected – in seconds

- BERT Sync Loss – the number of times Sync Loss was detected since BERT started to run

- BERT result – the number of error bits divided with the total number of data bits. This item holds 1 byte for the exponent and 2 bytes for the mantissa holding 1 byte before the period and 1 byte after the period

- BERT Sync Loss state – the Sync Status while BERT runs. The BERT Sync Loss state has the following values:

  - SyncLoss = OFF

  - Sync = ON

- BERT sync run time – the total number of seconds in which sync have been detected – in seconds.

5.6   Frequently Asked Questions

Question: Why can't I access some fields in the CM-2 Terminal Management screens?

Answer: In the menus of CM-2, there are some parameters you CAN change in each menu, and there are some parameters that you can NOT change in each menu.

This is because the CM-2 manages many different modems, and at RAD we designed one single interface for all the modem cards inside the LRS-24, no matter which modem is being managed. That is why you will see that some parameters are inaccessible for you (because they are accessible for other modems, not ASMi-52CD, for example).

Please remember to navigate the menus via the TAB key, and to change values by pressing the "f" (forward) key, and the "b" (backward) key. Press 'Enter' to select the desired value.

Question: How does LRS-24 manage ASMi-52 cards?

Answer: The LRS-24 manages ASMi-52CD and ASMi-52CQ cards like any other I-mode modem. This means that there are no separate IP addresses for each card in the LRS, and the SNMP agent your NMS communicates with is the CM-2, not the modem itself.

5.7   Technical Support

Technical support for this product can be obtained from the local distributor from whom it was purchased.

For further information, please contact the RAD distributor nearest you or one of RAD's offices worldwide. This information can be found at www.rad.com. (Offices – About RAD › Worldwide Offices; Distributors – Where to Buy › End Users).

Appendix A

Pinouts

A.1 LRSI-F-18 and LRSI-F-19 Connections

DCE Connector Pinout for LRSI-F-18 and LRSI-F-19

The DCE interface of the LRSI-F-18 and LRSI-F-19 modules terminates in a 68-pin SCSI connector (see *Table* A-1 for connector pinout).

Table A-1. Pin Assignment of the DCE Connector for LRSI-F-18 and LRSI-F-19

	Type		V.35		RS-530		X.21		SCSI 68-pin			
	Connector		34-Pin		DB-25		DB-15					
	Function	Pin	ID	Circuit	Pin	Circuit	Pin	ID	CH-1	CH-2	CH-3	CH-4
Ground	Protective Ground	A	FGND	101	1		1	SHIELD	8	24	36	52
	Signal Ground	B	SGND	102	7	AB	8	GND	18	34	46	62
Data	Transmitted Data	P	TD(A)	103	2	BA(A)	2	T(A)	10	22	38	50
		S	TD(B)	103	14	BA(B)	9	T(B)	14	26	42	54
	Received Data	R	RD(A)	104	3	BB(A)	4	R(A)	3	21	49	66
		T	RD(B)	104	16	BB(B)	11	R(B)	1	25	45	67
Control	Request to Send	C	RTS	105	4	CA(A)	3	CA(A)	6	19	35	51
					19	CA(B)	10	CA(B)	7	23	39	55
	Carrier Detect	F	DCD	109	8	CF(A)	5	(A)	11	27	43	59
					10	CF(B)	12	(B)	15	31	47	63
Timing	External Transmit Clock	U	SCTE(A)	113	24	DA(A)	7	(A)	16	28	44	56
		W	SCTE(B)	113	11	DA(B)	14	(B)	20	32	48	58
	Transmit Clock	Y	SCT(A)	114	15	DB(A)	6	S(A)	4	13	57	64
		AA	SCT(B)	114	12	DB(B)	13	S(B)	2	17	53	68
	Receive Clock	V	SCR(A)	115	17	DD(A)	–		5	29	41	65
		X	SCR(B)	115	9	DD(B)			9	33	37	61

Note   *There are four SCSI pins that are not assigned.*

Line Connector Pinout for LRSI-F-18

The line interface of the LRSI-F-18 module terminates in an RJ-11 line connector, (see *Table* A-2 for the connector pinout).

Table A-2. Pin Assignment of the RJ-11 Line Connector for LRSI-F-18

Pins	ID	Function	Direction
1, 2,3	–	Not connected	–
4, 5	LINE	Bidirectional line	Input/Output
6	–	Not connected	–

A.2   LRSI-F-20 and LRSI-F-28 Connections

DCE Connector Pinout for LRSI-F-20 and LRSI-F-28

The DCE interface of the LRSI-F-20 and LRSI-F-28 terminates in a RJ-45 connector (see *Table* A-3 for connector pinout).

Table A-3. Pin Assignment of the DCE Connector for LRSI-F-20 and LRSI-F-28

Pin	Name	Function
1	RX (+)	Receive Data Positive
2	RX (-)	Receive Data Negative
4	TX (+)	Transmit Data Positive
5	TX (-)	Transmit Data Negative

Line Connector Pinout for LRSI-F-28

The line interface of the LRSI-F-28 module terminates in an RJ-11 line connector, (see *Table* A-4 for the connector pinout).

Table A-4. Pin Assignment of the RJ-45 Line Connector for LRSI-F-28

Pins	ID	Function	Direction
1, 2	Line A		
3	–	Not connected	–
4, 5	Line B		

A.3   LRSI-F-21 and LRSI-F-29 Connections

DCE Connector Pinout for LRSI-F-21 and LRSI-F-29

The DCE interface of the LRSI-F-21 and LRSI-F-29 terminate in a DB-25 female connector (see *Table* A-5 for connector pinout).

Table A-5. Pin Assignment of the DCE Connector for LRSI-F-21 and LRSI-F-29

Name	Function	Pin			
		CH-1	**CH-2**	**CH-3**	**CH-4**
RX (+)	Receive Data Positive	24	21	18	15
RX (-)	Receive Data Negative	11	9	6	3
TX (+)	Transmit Data Positive	23	20	17	14
TX (-)	Transmit Data Negative	12	8	5	2

Line Connector Pinout for LRSI-F-29

The line interface of the LRSI-F-29 module terminates in a RJ-45 line connector, (see *Table B-6* for the connector pinout).

Table A-6. Pin Assignment of the RJ-45 Line Connector for LRSI-F-29

Pins	ID	Function	Direction
1, 2	Line A		
3	–	Not connected	–
4, 5	Line B		

CBL-LRSI21/DB25/UB Cable Pinout

Splitter cable for connecting the DB-25 connector of the LRSI-F-21 interface module to four BNC unbalanced ports. The CBL-LRSI21/DB25/UB/M cable comprises one male DB-25 and eight male BNC connectors (see *Figure* A-1). The CBL-LRSI21/DB25/UB/F cable comprises one male DB-25 and eight female BNC connectors . *Table* A-7 lists the CBL-LRSI21/DB25/UB cable pinout.
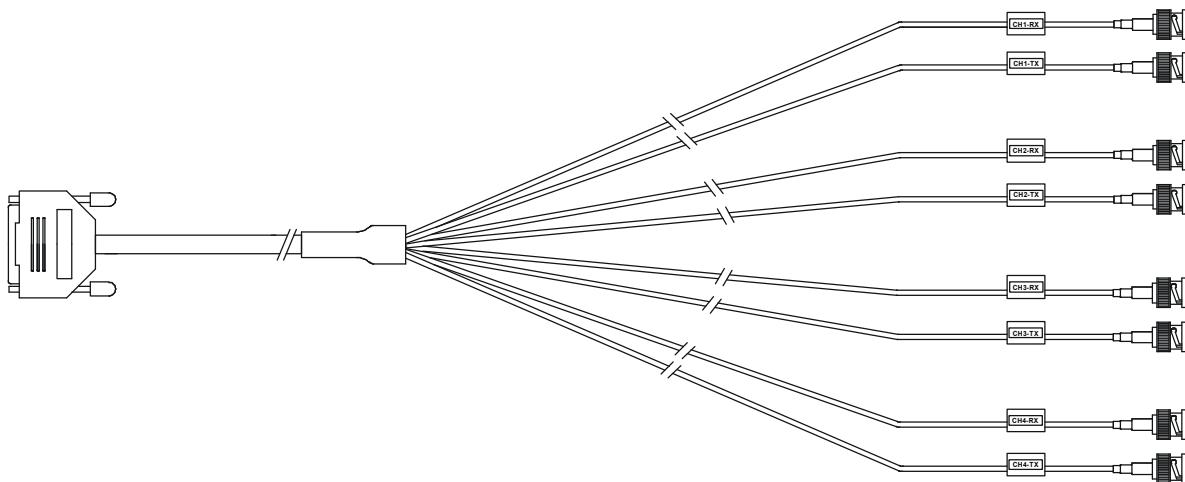
Figure A-1. CBL-LRSI21/DB25/UB Cable

Table A-7. CBL-LRSI21/DB25/UB Cable Pinout

		DB-25	**BNC**	
CH-1	RX	23	CH1-RX	1
		11	CH1-RX	2
	TX	24	CH1-TX	1
		12	CH1-TX	2
CH-2	RX	20	CH2-RX	1
		8	CH2-RX	2
	TX	21	CH2-TX	1
		9	CH2-TX	2
CH-3	RX	17	CH3-RX	1
		5	CH3-RX	2
	TX	18	CH3-TX	1
		6	CH3-TX	2
CH-4	RX	14	CH4-RX	1
		2	CH4-RX	2
	TX	15	CH4-TX	1
		3	CH4-TX	2

Appendix B

Parameter List

This chapter lists:

- Command options to manage the ASMi-52CQ modem using an ASCII terminal

- Parameters with their values and explanations.

B.1 Configuring Advanced Modem Parameters

➤ **To configure advanced modem parameters:**

1. From the Main menu, select **Modem Operation**.

2. Select the ASMi-52CQ slot.

    The Modem Advanced Setup menu shown in *Figure B-1* appears. When this menu first appears, all parameters are set to either the default or inactive state to prevent an undesired modem response.

```
MODEM ADVANCED SETUP
--------------------
        MODEM NAME:    ASMi-52CQ
DEFINE MODEM PORT NUMBER             : 1
MODEM STATUS                         : MASTER
SELECT MODEM                         : MODEM 1 LOCAL
1) STOP STATUS UPDATE                : DISABLE
2) CHANGE LOCAL MODEM STATUS         : MASTER
3) MANAGEMENT FROM REMOTE MODEM      : NO
4) MODEM MANAGEMENT LINK             : N/A
5) LOAD CONFIGURATION FROM           : N/A       MODEM
6) I-TYPE (FAR_END MODEM TYPE)       : YES
7) MODEM RESET                       : NO
8) FACTORY RESET                     : NO
9) CARD RESET                        : NO
```

Figure B-1. Modem Advanced Setup Menu

Bolded rows in *Figure B-1* indicate parameters applicable to ASMi-52CQ. Non-bolded parameters listed on the screen apply to other modems installed in the LRS-24 chassis.

Table B-1 shows the operational parameters and options for ASMi-52CQ that can be viewed and/or modified using this screen.

Table B-1. Modem Advanced Setup Screen Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Viewing modem type		The modem connected to the terminal is:
			ASMi-52CQ	Master ASMi-52CQ
			ASMi-52	Standalone modem
MODEM STATUS	Read	Viewing modem configuration mode	MASTER	N/A
SELECT MODEM	Write	Selecting the modem, whose operational parameters are set	MODEM1 LOCAL MODEM2 LOCAL MODEM3 LOCAL MODEM4 LOCAL	Operational parameters are set for one of the local modems installed in the LRS-24 chassis
			MODEM1 REMOTE MODEM2 REMOTE MODEM3 REMOTE MODEM4 REMOTE	Operational parameters are set for one of the remote modems
STOP STATUS UPDATE	Write	Controlling status information flow from the modem to CM-2	DISABLE	Enables flow of status information from modem to CM-2
			ENABLE	Disables flow of status information from modem to CM-2. This may occur when CM-2 services other LRS-24 modems and there is an overflow of alarm messages.
MODEM RESET	Write	Resetting the modem line	YES	Performs reset to modem line
			NO	Does not perform reset to modem line
FACTORY RESET	Write		YES	Resets modem to default settings
			NO	Does not reset modem to default settings
CARD RESET	Write	Resetting parameters of card	YES	Performs reset to card
			NO	Does not perform reset to card

B.2   Configure Transmission Parameters

The Modem Setup menu allows you to configure transmission parameters of ASMi-52CQ, including line and DTE values.

➤ **To configure the transmission parameters:**

1. From the Main menu, select **Modem Parameters**.

2. Select the ASMi-52CQ slot.

    The Modem Setup menu appears (see *Figure B-2*). The Modem Setup menu enables you to set the transmission parameters of the local and remote modems.

3. Configure the transmission parameters. Refer to *Figure B-2* and *Table B-2*.

    Rows in **bold** in *Figure B-2* indicate parameters applicable to ASMi-52CQ. Non-bold parameters listed on a screen apply to other modems installed in the LRS-24 chassis.

4. Configure the E1/T1 parameters by moving the cursor to **NEXT PARMETERS (E1/T1)** field by pressing **‹Tab›**, select **YES** by pressing **‹F›** or **‹B›**, and pressing **‹Tab›** again.

    The Modem Setup Menu: E1/T1 Parameters screen appears (see *Figure B-3*. *Table B-3* explains the E1 parameters, and *Table B-4* explains the T1 parameters on this screen.

5. Configure the SHDSL line parameters by moving the cursor to **NEXT PARMETERS (LINE)** field by pressing **‹Tab›**, select **YES** by pressing **‹F›** or **‹B›**, and pressing **‹Tab›** again.

    The Modem Setup Menu: Line Parameters screen appears (see *Figure B-4*). *Table B-3* explains the parameters on this screen.

```
MODEM SETUP


                    MODEM NAME:                        ASMi-52CQ


DEFINE MODEM PORT NUMBER     : 1
MODEM STATUS                 : MASTER PERMANENT
SELECT MODEM                 : MODEM 1 LOCAL
SYNC/ASYNC           : N/A            CHARACTER LENGTH      : N/A
NO. STOP BIT         : N/A            DATA RATE             : 128K
PARITY               : N/A            CD SENSE              : N/A
CLOCK SOURCE LOC/REM  : N/A EXT SOURCE:Modem #1  PORT          : N/A
INTERFACE            : N/A            RTS/CTS DELAY (0:255   : N/A)
RTS TO DCD           : N/A            DTR TO DSR            : N/A
OUTPUT LEVEL         : N/A            INPUT LEVEL          : N/A
OUTPUT IMPEDANCE     : N/A   ohm      INPUT IMPEDANCE      : N/A   ohm
CARRIER CONTROL      : N/A            ERROR CORRECTION     : N/A
RATE ADAPTATION METHOD: N/A           AIS                  : N/A
LINE CODING          : N/A            PHANTOM              : N/A
T1 LINE LENGTH       : N/A
BRIDGING             : N/A            ETHERNET MODE        : HALF-DUP
MASK SIGNAL STATUS   :     DATA: NO   RTS : NO    TD : NO    RD: NO
                           DCD : NO   TEST: NO    ERR: NO    SQ: NO
NEXT PARAMETERS(E1)     : NO          NEXT PARAMETERS(LINE):NO
```

Figure B-2. Modem Setup Menu

```
          MODEM NAME: ASMi-52CQ
 DEFINE MODEM PORT NUMBER: 1
 MODEM STATUS                : MASTER PERMANENT
 SELECT MODEM                : MODEM 1 LOCAL
 FRAME MODE(E1) :            :G732N    SYNC(E1)  : CCITT     CRC4(E1) :YES
 IDENTICAL SET               : YES    IDLE CODE(E1): ff        BALANCE   :UNBALANCE
 TS0 :TRANSP   TS1 : DATA    TS2 : DATA    TS3 : DATA    TS4 : DATA    TS5 : DATA
 TS6 : DATA    TS7 : DATA    TS8 : DATA    TS9 : DATA    TS10: DATA    TS11: DATA
 TS12: DATA    TS13: DATA    TS14: DATA    TS15: DATA    TS16: DATA    TS17: DATA
 TS18: DATA    TS13: DATA    TS20: DATA    TS21: DATA    TS22: DATA    TS23: DATA
 TS24: DATA    TS25: DATA    TS26: DATA    TS27: DATA    TS28: DATA    TS29: DATA
 TS30: DATA    TS31: DATA
```

Figure B-3. Modem Setup Menu: E1 Parameters

```
            MODEM NAME: ASMi-52CQ
DEFINE MODEM PORT NUMBER: 1
MODEM STATUS             : MASTER PERMANENT
SELECT MODEM             : MODEM 1 LOCAL
POWER BACKOFF            : DISABLE        SNEXT MARGIN    : DISABLE MARGIN
CURRENT MARGIN           : DISABLE MARGIN  ASYM PSD        : SYMMETRIC
LINE PROB                : FIXED          PORT CLK SOURCE : MASTER CLOCK
CONFIGURED WIRE          : 2W
TRANSMISSION MODE        : ANNEX B
ATTENUATION THRESHOLD    : 0              SNR MARGIN THRESHOLD: 0
MUX MODE                 : N/A            LOW SPEED OPERATION : N/A
```

Figure B-4. Modem Setup Menu: Line Parameters

Table B-2. Modem Setup Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Identifies the modem type which status is being viewed or modified	ASMi-52CQ	Master ASMi-52CQ
			ASMi-52	Standalone ASMi-52 modem
MODEM STATUS	Read	Enables view the modem configuration control status	MASTER	N/A
			PERMANENT	
SELECT MODEM	Write	Selects the modem, which operational parameters are set	MODEM1 LOCAL MODEM2 LOCAL MODEM3 LOCAL MODEM4 LOCAL	Operational parameters are set for one of the local modems installed in the LRS-24 chassis
			MODEM1 REMOTE MODEM2 REMOTE MODEM3 REMOTE MODEM4 REMOTE	Operational parameters are set for one of the remote modems
DATA RATE	Write	Sets data rate transmitted between the modems	64, 128, 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536, 1600, 1664, 1728, 1792, 1856, 1920, 1984, 2048, 2304 kbps	
CLOCK SOURCE LOCAL/REMOTE	Write	Sets timing mode of local and remote modems (Not for E1 modem)	Internal	Clock is supplied by internal oscillator.
			System	External source derived from LRS-24 that supplied the system clock to all the hub's modems. (2.048 MHz)
			DCE-EXT	Clock for indicated port connection is in external mode
MUX MODE		E1, E1 + LAN, E1 + IR (for remote modems)	N/A (for local modems)	

Table B-3. Modem Setup: E1 Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Identifies the modem type which status is being viewed or modified	ASMi-52CQ ASMi-52	Master ASMi-52CQ Standalone ASMi-52 modem
MODEM STATUS	Read	Displays the modem configuration control status	MASTER PERMANENT	N/A
FRAME MODE	Write	Selects the framing mode	Unframed G732N G732S transparent	Stream of bits at 2.048 Mbps Timeslot 0 contains sync word 16 frames per multiframe, timeslot 16 is passed transparently
SYNC	Write	Selects time required for the E1 port to return to normal operation after sync loss	CCITT Fast 62411	As per requirements of ITU-T Rec.G.732 After 1 sec As per requirements of AT&T TR-62411 (after 10 sec)
CRC4	Write	Enables generation and checking of check bits as per CRC-4 polynomial specified by ITU G.704. Available only for the G732N framing mode.	YES NO	Enable CRC-4 code generation Disable CRC-4 code generation
IDLE CODE	Write	Selects the code transmitted to fill idle (unused) timeslot in the E1 frames	Hex value from 00 to FF	
BALANCE	Read	Indicates whether the interface is balanced or unbalanced	Balanced Unbalanced	

Parameter	Type	Use	Value	Indication
TS	Write	Assigns each timeslot to carry data	DATA NOT_CONNECT	TS0 may be looped or transparent: **Looped:** TS0 is sent back to the E1 interface, when operating opposite remote units with a serial data interface. **Transparent:** TS0 is transmitted to the remote modem. With G732S transparent framing, TS0 is always transparent and TS16 is always connected. When operating opposite an ASMi-52CQ with V.35 interface, assign at least six timeslots, including timeslot 0 to carry data.
Unit Identical Set	Write	Copies Sync Mode, Time Slot Assignment and Idle Code definitions to remote modem	YES	Copies parameters to the remote modem
			NO	Parameters must be defined in both modems individually

Table B-4. Modem Setup: T1 Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Identifies the modem type whose status is being viewed or modified	ASMi-52CQ ASMi-52	Master ASMi-52CQ Standalone ASMi-52 modem
MODEM STATUS	Read	Displays the modem configuration control status	MASTER PERMANENT	N/A
FRAME MODE	Write	Selects the framing mode	Unframed	Stream of bits at 2.048 Mbps
			ESF	24 frames per multi-frame
			SF	12 frames per multi-frame
LINE CODING	Write		B8ZS	B8ZS coding
			AMI	AMI coding
SYNC	Write	Selects time required for the T1 port to return to normal operation after sync loss	CCITT	As per requirements of ITU-T Rec.G.732
			Fast	After 1 sec
			62411	As per requirements of AT&T TR-62411 (after 10 secs).

Parameter	Type	Use	Value	Indication
RECEIVE GAIN	Write	Sensitivity of the receive equalizer	Long	-36 dB
			Short	15 dB
INTERFACE	Write		DSU	DSU interface
			CSU	CSU interface
Transmit signal mask (DSU mode)	Write	Length of a cable in feet between the T1 port connector and the network access point	0 feet	0 to 133 feet
			133 feet	133 to 266 feet
			266 feet	266 to 399 feet
			399 feet	399 to 533 feet
Transmit signal mask (CSU mode)	Write	Relative T1 output transmit level	7.5 dB	Attenuation of 7.5 dB relative to the nominal transmit level
			15 dB	Attenuation of 15 dB relative to the nominal transmit level
			22.5 dB	Attenuation of 22.5 dB relative to the nominal transmit level
Fbit configuration	Write	Fbit transmission mode	Transparent	F bits are sampled at TSER
			Internally Source	F bits are sourced internally
IDLE CODE	Write	Selects the code transmitted to fill idle (unused) timeslot in the E1 frames	Hex value from 00 to FF	
BALANCE	Read	Indicates whether the interface is balanced or unbalanced	Balanced	
			Unbalanced	
TS	Write	Assigns each timeslot to carry data	DATA NOT_CONNECT	Timeslots are assigned to carry data
Unit Identical Set	Write	Copies Sync Mode, Time Slot Assignment and Idle Code definitions to remote modem	YES	Copies parameters to the remote modem

Table B-5. Modem Setup: Line Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Identifies the modem type which status is being viewed or modified	ASMi-52CQ	ASMi-52CQ
			ASMi-52	Standalone ASMi-52 modem
SELECT MODEM	Write	Selects the modem, whose operational parameters are set	MODEM1 LOCAL MODEM2 LOCAL MODEM3 LOCAL MODEM4 LOCAL	Operational parameters are set for one of the local modems installed in the LRS-24 chassis
			MODEM1 REMOTE MODEM2 REMOTE MODEM3 REMOTE MODEM4 REMOTE	Operational parameters are set for one of the remote modems
MODEM STATUS	Read	Displays the modem configuration control status	MASTER PERMANENT	N/A
POWER BACKOFF	Write	Determines whether to use the transmitted power backoff	Enable	Enable transmitted power backoff
			Disable	Disable transmitted power backoff
SNEXT MARGIN	Write	Selects the minimum desired target margin with a worst case self next noise model given current loop insertion (49 SHDSL next is considered the worst case) Available only if the rate adaptation is enabled (see line probing configuration below)	Integer between -10 and 10	Select Snext margin value
			Disable	Disable Snext margin Allows the use of all line rates, regardless of line condition
CURRENT MARGIN	Write	Selects the minimum desired target margin for the local line conditions during the startup sequence. Available only if the rate adaptation is enabled (see line probing configuration below)	Integer between -10 and 10	Select current margin value
			Disable	Current margin disabled Allows the use of all line rates, regardless of line condition

Parameter	Type	Use	Value	Indication
ASYM PSD	Write	Defines the amount of power applied to the information signal in order to achieve a satisfactory level of signal strength at the receiving end of the circuit	Symmetric / Asymmetric	Supported in both Annex A and Annex B modes • Annex A at 768 kbps • Annex B at 2048 kbps
LINE PROB	Write	Indicates whether the modem should perform a line probing in order to find the best possible rate of transmission	Fixed / Adaptive	Disable line probing / Enable line probing ASMi-52CQ modems support "Adaptive " only.
PORT CLK SOURCE	Write	Sets timing mode of the current modem (non-E1 modems only)	Master	Selected modem operated with the clock set by the Clock Source field of the Modem Setup menu (see *Figure B-2*)
			External	External source derived from the adjacent DTE port
		E1 modems only per port	Internal	Clock provided per port
			System	LRS-24
			External	DTE
CONFIGURED WIRE	Write	Indicates whether the modem is operating over 2 or 4 wires	2	Permanently set to 2-wire
TRANSMISSION MODE	Write	Selects the transmission mode	Annex A / Annex B	
ATTENUATION THRESHOLD	Write	Sets the acceptable difference (in dB) between the power transmitted from the ASMi-52CQ modem and the power received by the remote modem.	0 dB to 127 dB	Minor alarm is generated (LOOP ATTN. OVER LINE A), if selected loop attenuation threshold value is exceeded
SNR MARGIN THRESHOLD	Write	Sets the signal-to-noise ratio threshold.	0 dB to 15 dB	Minor alarm is generated (SNR MARGIN OVER LINE A), if the selected signal-to-noise ratio threshold is exceeded

B.3   Displaying Modem Status

➤   **To display modem status:**

1.   From the Main menu, select **Modem Status**.

2.   Select the ASMi-52CQ slot.

The Modem Status screen appears (see *Figure B-5*). The Modem Status
screen provides information on the system interfaces and front panel LED
status. *Table B-6* explains the parameters on this screen.

3.   To display the second page of parameters, move the cursor to **NEXT
PARAMETERS** field by pressing **‹Tab›**, select **YES** by pressing **‹F›** or **‹B›**, and
pressing **‹Tab›** again.

The second page of the Modem Status screen appears (see *Figure B-6*).
Table B-7 explains the parameters on this screen.

```
MODEM STATUS
                MODEM NAME: ASMi-52CQ
DEFINE MODEM PORT NUMBER: 1
SELECT MODEM        : MODEM 1 LOCAL  REMOTE MODEM          : NULL
INTERFACE MODULE    : LRSI-F-20      REMOTE SLOT           : N/A
MODEM PORT          : E1             REMOTE MODEM LINE CONNECTOR:TERM.BLOCK
SW VERSION          : 0.2E1          REMOTE MODEM FRONT PANEL    : N/A
HW VERSION          : 00 .00         HW PANEL VERSION            : 03
LED STATUS:         1)RTS: OFF       2)DCD: OFF    3)TEST: OFF   4)ERR: ON
                    5)ELE-LOW: ON    6)ELE-AIS: OFF 7)OPT-LOW: OFF     8)OPT-
AIS: OFF
LINK QUALITY        : N/A            PS PHANTOM STATUS      : N/A
BPV ERROR           : N/A            CHASSIS                : N/A
FIBER OPTIC ERROR   : N/A            WAVE LENGTH            : 850
LINE UTILITY        : 01 %
BERT RUN TIME       : 0              BERT ERR SECONDS       : 0
BERT SYNC LOSS      : 0              BERT PRE FEC           : 0
BERT POST FEC       : 0
NEXT PARAMETERS     : NO
```

Figure B-5. Modem Status Screen

Bolded rows in *Figure B-5* indicate parameters applicable to ASMi-52CQ.
Non-bolded parameters listed on a screen to other modems installed in the
LRS-24 chassis.

The Modem Status parameters and values are explained in *Table B-6*.

Table B-6. Modem Status Screen Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Displays the modem type	ASMi-52CQ	Master ASMi-52CQ
			ASMi-52	Standalone ASMi-52 modem
SELECT MODEM	Write	Selects local or remote modem	MODEM1 LOCAL MODEM2 LOCAL MODEM3 LOCAL MODEM4 LOCAL	Status is displayed for one of the local modems installed in the LRS-24 chassis.
			MODEM1 REMOTE MODEM2 REMOTE MODEM3 REMOTE MODEM4 REMOTE	Status is displayed for one of the remote modems
REMOTE MODEM	Read	Displays the remote modem type	ASMi-52 ASMi-52L	Standalone ASMi-52 modem
REMOTE MODEM LINE CONNECTOR	Read	Displays the type of connector at the remote modem		The type of connector at the remote modem is displayed
INTERFACE MODULE	Read	Displays the type of interface module in LRS-24 chassis	LRSI-18	LRSI-F-18 LRSI-B-18
			LRSI-19	LRSI-F-19 LRSI-B-19
			LRSI-20	LRSI-F-20 LRSI-B-20
			LRSI-21	LRSI-F-21 LRSI-B-21
			LRSI-27	LRSI-F-27 LRSI-B-27
			LRSI-28	LRSI-F-28 LRSI-B-28
			LRSI-29	LRSI-F-29 LRSI-B-29
MODEM PORT	Read	Displays the type of digital interface mounted on the modem. This parameter is needed to associate a DCE connector with several digital interfaces mounted on the ASMi-52CQ module	V.35	V.35
			RS-530	RS-530
			X.21	X.21
			E1	E1
			ETH	ETH
SW VERSION	Read	Displays current software version		

Parameter	Type	Use	Value	Indication
HW VERSION	Read	Displays current hardware version		
HW PANEL VERSION	Read	Displays current LRSI panel hardware version		
LED STATUS	Read	Displays status of front panel LEDs	ON, OFF (for interpretation of the LED states, see *Chapter 2*	

```
                    MODEM NAME: ASMi-52CQ
DEFINE MODEM PORT NUMBER: 1
SELECT MODEM      : MODEM 1 LOCAL
WIRE MODE         : 2W                 PS1 TYPE          : NONE
SHDSL MODE        : STU-C              PS2 TYPE          : NONE
BERT PATTERN      : N/A
FRAMER TYPE       : SLOTTED E1         ACTUAL ANNEX      : ANNEX B
LINE STATUS A     : SYNC               LINE STATUS B     :SYNC N/A
SHDSL STATUS A    : DATA               SHDSL STATUS B    : N/A
LINE RATE A       : 2048K + 8K         LINE RATE B       : N/A
LINE TOTAL RATE   : 2048K + 8K         ACTUAL PSD        : ASYM PSD DISABLE
EOC COMP          : PROPRIETARY        TIP RING          : NORMAL
CURRENT NOISE MARGIN A : 15 dB         12 dB             : 0 dBs
CURRENT LOOP ATTN A    : 0:0 dB        0:0 dB            : 0.0 dB
MUX TYPE               : E1            E1 + LAN          : E1 + IR Serial IF
```

Figure B-6. Modem Status Screen: Second Screen

Table B-7. Modem Status Screen: Second Screen Parameters

Parameter	Type	Use	Value	Indication
MODEM NAME	Read	Displays the modem type	ASMi-52CQ ASMi-52	Master ASMi-52CQ Standalone ASMi-52 modem
SELECT MODEM	Write	Selects the modem	MODEM1 LOCAL MODEM2 LOCAL MODEM3 LOCAL MODEM4 LOCAL	Operational parameters are set for one of the local modems installed in the LRS-24 chassis.
			MODEM1 REMOTE MODEM2 REMOTE MODEM3 REMOTE MODEM4 REMOTE	Operational parameters are set for one of the remote local modems
RATE SUPPORTED	Read	Data rate supported by the modem	2M 4M	

Parameter	Type	Use	Value	Indication
PS1 TYPE	Read	Type of power supply 1 (remote standalone only)	AC, DC	
PS2 TYPE	Read	Type of power supply 2 (remote standalone only)	AC, DC	
SHDSL MODE	Read	Modem location	STU-C	Central
WIRE MODE	Read	Line interface type	2W	2 wires
BOX TYPE	Read	Type of remote unit enclosure	PLASTIC METAL	
FRAMER TYPE	Read	SHDSL framer type	N*64 E1 SLOTTED (E1 only) T1 SLOTTED (T1 only)	
ACTUAL ANNEX	Read	Annex compatibility	ANNEX A ANNEX B	
LINE STATUS A	Read	Status of Line A	SYNC NOT SYNC	
SHDSL STATUS A	Read	Status of DSP A	IDLE HANDSHAKE TRAINING FRAME IN SYNC DATA DIGITAL LOOPBACK CORE LOOPBACK	
LINE RATE A	Read	Line A rate		
LINE TOTAL RATE	Read	Line A and Line B combined rate (no line B for 2-wire modems)		
ACTUAL PSD	Read	Current power spectral density type	RATE PSD UNKNOWN ASYNC PSD DISABLE ASYNC R1 ENABLE ASYNC R2 ENABLE	
EOC COMP	Read	Compatibility of the embedded operation channel	STANDARD PROPRIETARY	
TIP RING	Read	Wire polarity detection method	NORMAL REVERSED	

Parameter	Type	Use	Value	Indication
CURR NOISE MARGIN A	Read		0-20 dB	
CURR NOISE MARGIN B	Read		0-127 dB	
MUX TYPE		E1, E1 + LAN, E1 + IR	Remote	
		Not Mux	Local	

B.4   Displaying the Modem Log File

➤ **To display the modem log file:**

1. In the Modem Setup menu, select **Modem Log File**.

2. Select the ASMi-52CQ slot.

   A typical Modem Log File screen is shown in *Figure B-7*. The Modem Log File screen enables you to view in chronological order all the events pertaining to the modem location specified in the Modem Select field: LOCAL or REMOTE. The modem type is shown in the Modem Name field: ASMi-52CQ, or ASMi-52 (remote standalone).

```
MODEM LOG FILE

                MODEM NAME:ASMi-52CQ
DEFINE MODEM PORT NUMBER      : 1
SELECT MODEM                  : LOCAL
CODE      STATE      DESCRIPTION                       TIME       DATE
 68       ON         NearEndSyncLossB                  14:40      2003-03-11
 56       ON         NearEndIncompatibleConnectors 14:40      2003-03-11
 08       ON         NearEndSyncLoss                   14:40      2003-03-11



THERE ARE NO MORE PAGES AT THE MOMENT
```

Figure B-7. Modem Log File Screen

Appendix C

LRSI-F-27 Module

C.1 Overview

The ASMi-52CQ-Ethernet card includes four SHDSL independent modems for four 10/100BaseT Ethernet ports. The ASMi-52CQ-Ethernet card supports full or half duplex mode, autonegotiation, auto MDI-X and filtering at each of the 10/100BaseT Ethernet port.

The ASMi-52CQ-Ethernet card uses the LRSI-F-27 interface that has an Ethernet Port Bridge and an SHDSL line interface for each modem. The LRSI-F-27 module automatically learns MAC addresses on the Ethernet ports to which it is connected. Its MAC addresses table stores up to 2048 addresses and is automatically updated.

The ASMi-52CQ-Ethernet card supports IEEE 802.1p frames and IEEE 802.1q frames enabling VLAN applications. It also supports a priority feature using two queues.

Each Ethernet port has two LEDs to indicate activity and link integrity. It includes a DIP switch to configure the port.

The SHDSL line port works with 2-wire lines and contains protections against surge and lightning.

Versions

The ASMi-52CQ-Ethernet card is available in the following versions:

- ASMI-52CQF/ETH/2W/TB (ETSI)
- ASMI-52CQB/ETH/2W/TB (ANSI).

Application

Figure C-1 shows an integrated high performance Ethernet bridging in modems with LRSI-F-27.

The ASMi-52CQ-Ethernet card provides simple and cost-effective interconnection between 10/100BaseT LANs.
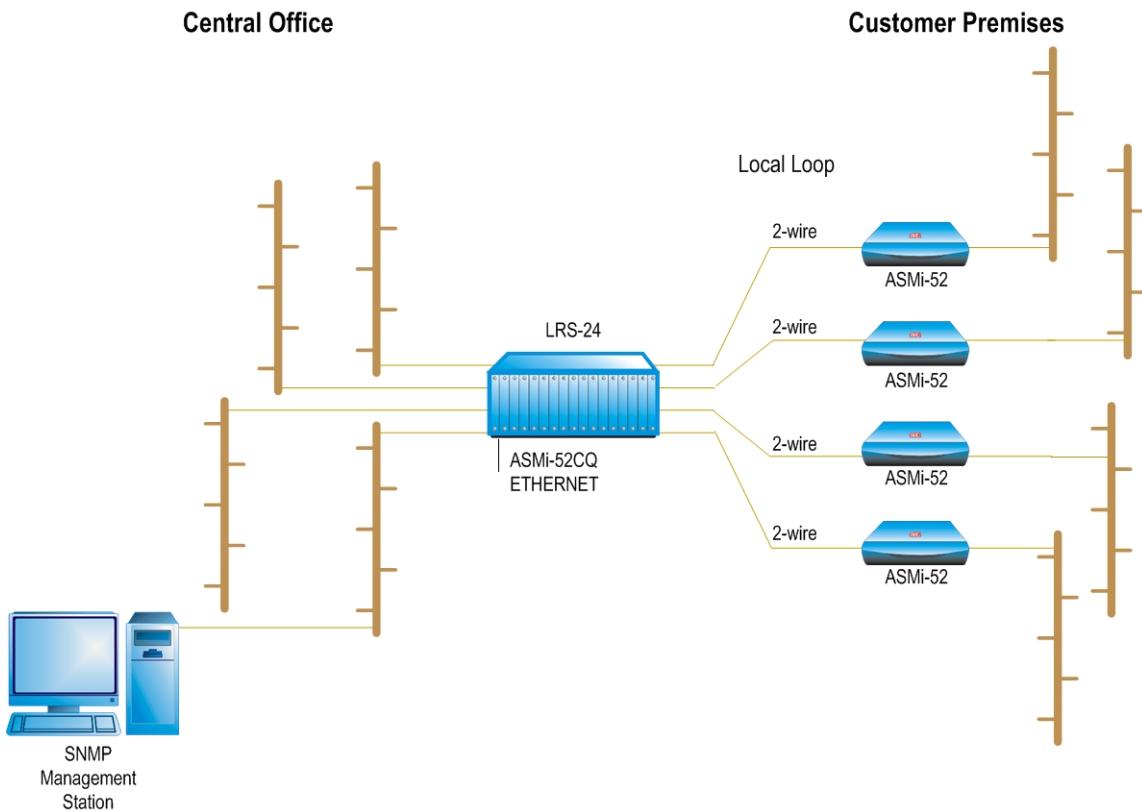

Figure C-1. Central Site Application with SNMP Management Application

Features

- High performance Ethernet/Fast Ethernet bridge module

- Compatible with IEEE 802.3, 802.1P 802.1Q, 802.1D (relevant parts), 802.3x, 02.3µ

- Four independent UTP (10BaseT or 100BaseT) Ethernet interface

- Four independent SHDSL 2-wire lines

- Line Interface, data rate from 64 kbps to 2304 kbps

- High-voltage line protection in compliance with ITU-T K.21and surge protection on the SHDSL lines

- Autonegotiation support

- 120-frame buffer (for 64-byte frames)

- 2048 MAC address LAN table

- Automatic learning and aging

- Automatic MDIX support

- Supports transparent VLAN forwarding

- Packet length of up to 1536 bytes

- Fault propagation of line interface error conditions to Ethernet port (optional feature)

- When filtering is enabled, there are two QoS levels via two priority queues to handle priority, which is determined in the following order:

  - If the packet received is an Ethernet tagged frame, product marks the packet according to the tag priority (0–7).

    - 0–3: low priority queue

    - 4–7: high priority queue

  - Otherwise, LRSI-F-27 marks the packet according to IP ToS priority (0–7).

    - 0–3: low priority queue

    - 4–7: high priority queue

  - Untagged and non-IP frames enter the low priority queue

- Product frames egress from the queues with a 1:2 ratio, two frames from high priority, one frame from low priority

- The products buffer holds 120 frames (of 64 bytes).

LRSI-F-27 Front Panels Options

Figure C-2 shows the two LRSI-F-27 front panel options, LRSI-F-27 and LRSI-B-27 modules.
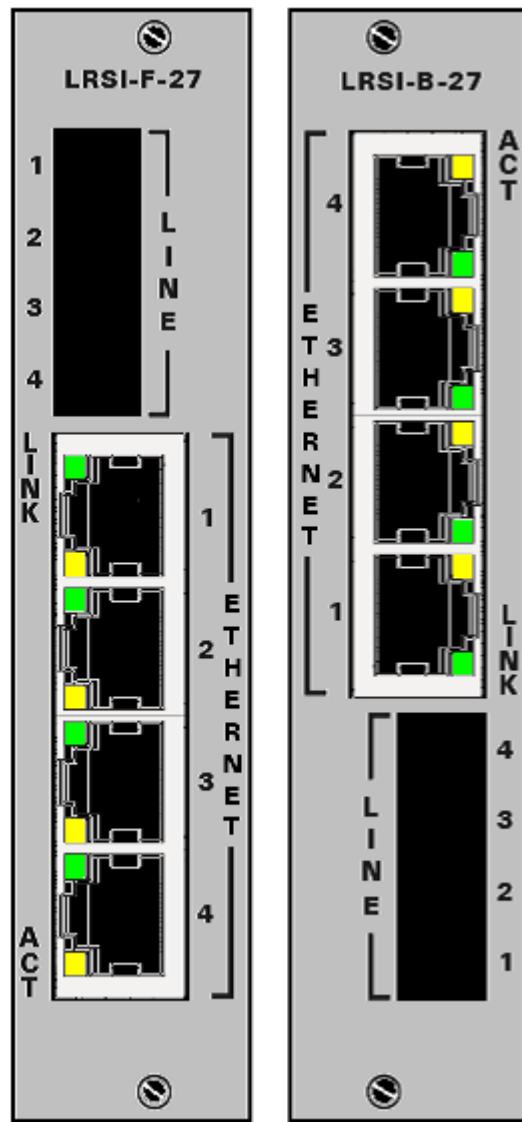

Figure C-2. LRSI-F-27 Module

C.2   Technical Specifications

Bridge	*LAN Table*	2048 MAC addresses with 5-minute automatic aging
	Aging	5 minute, automatic
	Buffer size	120 frames (Frame size 64 bytes)
	Packet Length	Up to 1536 bytes
Ethernet interface	*Standard*	IEEE 802.3/Ethernet V.2, 802.1P, 802.1Q, 802.1D (relevant parts), 802.3x, 802.3u
	Data Rate	10BaseT: 10 Mbps 100BaseT: 100 Mbps
	Connectors	Shielded RJ-45 (four independent ports) socket
LINE interface	*Standard*	SHDSL ITU-T G.991.2
	Data Rate	64 kbps to 2304 kbps
	Connectors	2 wire (four independent ports) Terminal block socket
	Protections	ITU-T K.21and surge protection

C.3   Installation and Setup

Ethernet Interface

➤ **To connect to the Ethernet interface:**

- Connect an Ethernet link using a UTP cable to the Ethernet interface.

Note

If auto MDI/MDIX is disabled, use the appropriate UTP cable (straight or crossed) for your application. Refer to the RJ-45 connector pinout in Table C-2.

Table C-1. RJ-45 Pinout

Pin	Name	Direction	Function
1	RD (+)	Input	Receive data positive
2	RD (-)	Input	Receive data negative
3	TD (+)	Output	Transmit data positive
6	TD (-)	Output	Transmit data negative

Indicators

LRSI-F-27 features two front-panel LEDs that indicate the link integrity and the Ethernet interface status. The function of each LED is described in *Table C-2*.

Table C-2. LRSI-F-27 LEDs

LED	Color	Location	Indication
LINK	Green	Connector	ON – Ethernet is connected
ACT	Yellow	Connector	Blinking – Ethernet Rx/Tx activity

Warning   *LRSI-F-27 module operates with ASMi-52CQ-Ethernet card only.*

LRSI-F-27 Module Switch Settings

Figure C-3 shows the LRSI-F-27 module DIP-switch SW1- SW4 settings. *Table C-3* describes the DIP switch SW1- SW4 settings parameters.
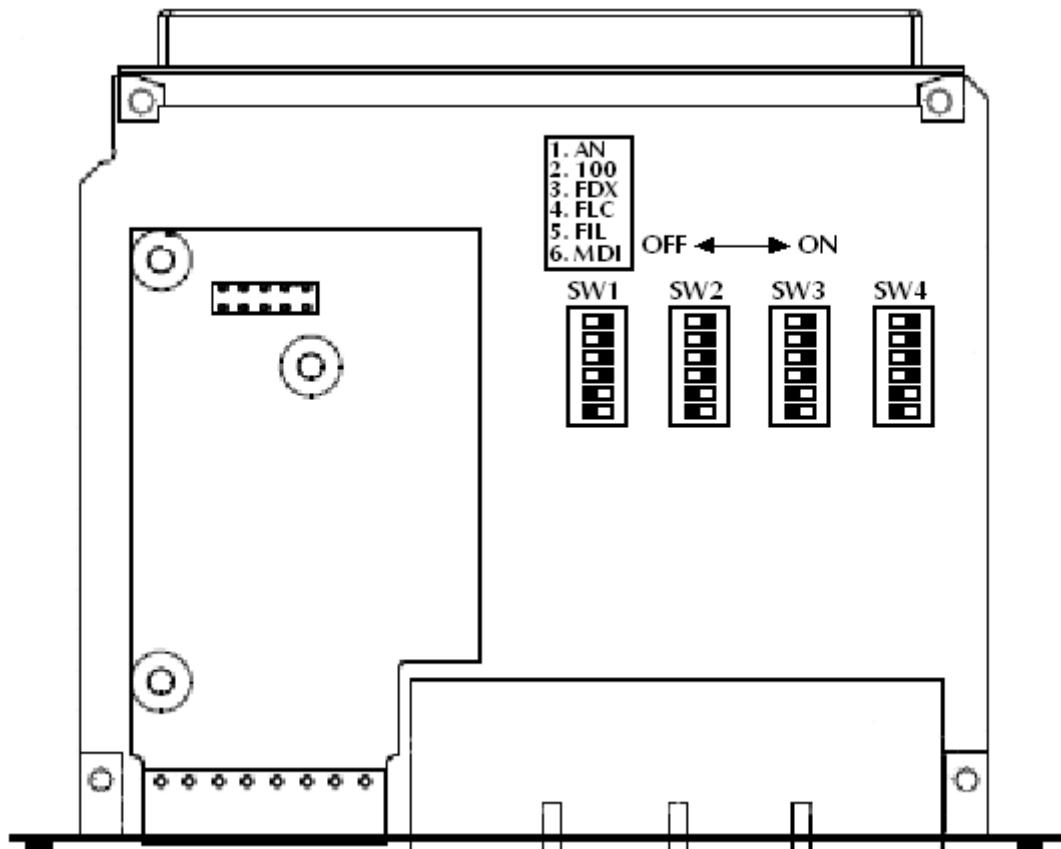

Figure C-3. DIP Switch SW1 - SW4 Settings

The positions of the switches are read only after flow control and Ethernet filtering power up reset.

Table C-3. DIP SW1- SW4 Switch Settings Parameters

Section	Name	Description	Possible Settings	Factory Setting
1	AN	Controls the Ethernet interface Auto negotiation	ON – Autonegotiation enabled OFF – Autonegotiation disabled	ON
2	100	Selects the Ethernet interface Speed	ON – Speed is set to 100 Mbps OFF – Speed is set to 10 Mbps	ON
3	FDX	Selects the Ethernet interface Duplex mode	ON – Full duplex mode OFF – Half duplex mode	ON
4	FLC	Enables or disables flow control (full duplex) backpressure (half duplex) *Note:* Flow Control (full duplex) is active only if autonegotiation is enabled	ON – Flow control/Backpressure is enabled OFF – Flow control/Backpressure is disabled	ON
5	FIL	Enable or disable Ethernet interface Filtering	ON – Filtering enabled OFF – Filtering disabled	OFF
6	MDI	Enables or disables automatic MDI/MDIX crossover	ON – Automatic MDI/MDIX crossover enabled OFF – Automatic MDI/MDIX crossover disabled	OFF

Note

When autonegotiation is enabled, the Ethernet interface speed and duplex mode are configured automatically. In this case, Sections 2 and 3 in Table C-3 are not applicable.

Fault Propagation

The LRSI-F-27 has a fault propagation option. This feature propagates the line interface side error conditions to the Ethernet port.

Fault propagation disables the Ethernet interface link when a control signal is not received from the line interface. The signal causes the Ethernet interface link to fall hence loosing the Ethernet interface link integrity.

Configuring Fault Propagation

➤ **To enable or disable Fault propagation:**

1. Go to the **Modem Setup** window in the terminal screen.

2. Select FAULT ETH INDICATION and set to **Yes** or **No**.

```
       MODEM SETUP

     _____
           MODEM NAME   :  ASMI-52CQ-ETH
 DEFINE MODEM PORT NUMBER          : 1
 MODEM STATUS                      : MASTER PERMANENT
 SELECT MODEM                      : MODEM 1 LOCAL
 SYNC/ASYNC             : N/A           CHARACTER LENGTH      :N/A
 No. STOP BIT           : N/A           DATA RATE             :1792K
 PARITY                 : N/A           CD SENSE              :N/A
 CLOCK SOURCE LOC/REM   : SYS           EXT SOURCE   :Modem #1 PORT :N/A
 INTERFACE              : N/A           RTS/CTS DELAY (0:255) :N/A
 RTS TO DCD             : N/A           DTR TO DSR            :N/A
 OUTPUT LEVEL           : N/A           INPUT LEVEL           :N/A
 OUTPUT IMPEDANCE       : N/A    ohm    INPUT IMPEDANCE       :N/A    ohm
 CARRIER CONTROL        : N/A           ERROR CORRECTION      :N/A
 RATE ADAPATION METHOD  : N/A           AIS                   :N/A
 LINE CODING            : N/A           PHANTOM               :N/A
 T1 LINE LENGTH         : N/A           FAULT ETH INDICATION  :YES
 BRIDGING               : N/A           ETHERNET MODE         :N/A
 MASK SIGNAL STATUS     : N/A   DATA:NO   RTS :NO    TD :NO   RD:NO
                               DCD :NO   TEST:NO    ERR:NO   SQ:NO   LOS:NO
 NEXT PARAMETERS(E1):    NO            NEXT PARAMETERS(LINE): NO
```

Figure C-4. Modem Setup (Fault Propagation) Screen

Customer Response Form

RAD Data Communications would like your help in improving its product documentation. Please complete and return this form by mail or by fax or send us an e-mail with your comments.

Thank you for your assistance!

Manual Name: ASMi-52CQ Ver. 2.12

Publication Number: 695-213-07/08

Please grade the manual according to the following factors:

	Excellent	Good	Fair	Poor	Very Poor
Installation instructions	❐	❐	❐	❐	❐
Operating instructions	❐	❐	❐	❐	❐
Manual organization	❐	❐	❐	❐	❐
Illustrations	❐	❐	❐	❐	❐
The manual as a whole	❐	❐	❐	❐	❐

What did you like about the manual?

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- ❑ Regulatory information (Safety, Compliance, Warnings, etc.)
- ❑ Difficulty in finding needed information
- ❑ Missing information
- ❑ Illogical flow of information
- ❑ Style (spelling, grammar, references, etc.)
- ❑ Appearance
- ❑ Other _____

Please list the exact page numbers with the error(s), detail the errors you found (information missing, unclear or inadequately explained, etc.) and attach the page to your fax, if necessary.

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Please add any comments or suggestions you may have.

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Publication No. 695-213-07/08

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